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PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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Coronado - (TV) TV1-9356A TV1 9357A 317-16S

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 279

Crosley chassis 431-1, 431-3, 432-1, 432-3, 443 and 443-3 were covered in Photofact Folder 3 - Set 279.

Chassis 431-4 and late production changes were added with the publication of Production Change Bulletin 137 - Set 297-1.

Chassis 431-5 is now added along with model additions and late production changes.

Following is a complete list of all models and chassis used in each.

MODEL	CHASSIS	MODEL	CHASSIS
H-17TOBHa	432-1	H-21HPBHa	443
H-17TOBHd	432-3	H-21HPBHd	443-3
H-17TOMHa	432-1	H-21HPWHa	443
H-17TOMHd	432-3	H-21HPWHd	443-3
H-17TOMNHa	432-1	H-12TCOBH	431-4
H-17TOWHa	432-1	H-21TCOMH	431-4
H-17TOWHd	432-3	H-21TCOWH	431-4
H-21CCOBH	431-4	H-21TOBHa	431-1
H-21CCOMH	431-4	H-21TOBHd	431-3
H-21CCOWH	431-4	H-21TOBUf	431-1
H-21COBHa	431-1	H-21TOMHa	431-1
H-21COBHd	431-3	H-21TOMHd	431-3
H-21COMHa	431-1	H-21TOMUf	431-1
H-21COMHd	431-3	H-21TOWHa	431-1
H-21COSBHa	431-1	H-21TOWHd	431-3
H-21COSBHd	431-3	H-21TOWUf	431-1
H-21COSHa	431-1	J-17TJBH	432-3
H-21COSHd	431-3	J-17TJMH	432-3
H-21COWHd	431-3	J-17TOWH	432-3
H-21HCBHa	431-1	J-21TJBH	431-3
H-21HCBHd	431-3	J-21TJBU	431-5
H-21HCMHa	431-1	J-21TJMH	431-3
H-21HCMHd	431-3	J-21TJMU	431-5
H-21HCWHa	431-1	J-21TOWH	431-3
H-21HCWHd	431-3	J-21TOWU	431-5

NEW CHASSIS ADDED

Chassis 431-5 is electrically identical to the chassis covered except for the following changes.

C48 is increased from 33MMF to 82MMF.

A 68MMF capacitor is added from pin 2 of V8 to ground.

The vertical hold control (R1) is changed to part #159338-1 (800KΩ with a 150KΩ stop).

CROSLEY CHASSIS 431-1, 431-3, 431-4, 431-5, 432-1, 432-3, 443, 443-3

PRODUCTION CHANGES
BULLETIN 155

PRODUCTION CHANGES
BULLETIN 155

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DENVER, COLORADO

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C29 is increased from 1000MMF to 5000MMF.

A .02MFD capacitor is added from the junction of C8 and R21 to ground.

R76 is decreased from 12KΩ to 8.2KΩ.

The following production changes were made late in production.

TO INCREASE WIDTH

R76 is decreased from 12KΩ to 8.2KΩ. Chassis incorporating this change are coded:

431-3 Code D

432-3 Code E

TO IMPROVE AUDIO

L24 (2nd. Sound IF) is changed to part #159873-1.

With this change C48 is increased from 33MMF to 82MMF.

Chassis incorporating these changes are coded.

431-3 Code D

432-3 Code F

TO PREVENT PICTURE BENDING OR VERTICAL ROLL

Sync couplate (C55A, B, C and R48A, B, C) is changed to part #170207-1.

V6, video output and sync separator changed from a 6AW8 to a 6BA8.

NOTE: When the triode section of the 6AW8 is used as a noise inverter the 6BA8 cannot be substituted.

Chassis incorporating these changes are coded.

431-3 Code E and later

432-3 Code G and later

431-5 Code C

431-3 Code G

432-3 Code J

TO IMPROVE STABILITY OF THE PICTURE

The B boost filter capacitors (C2D and C4) were changed in value and rewired. A partial schematic is given in Fig. 1 showing the new arrangement.

Chassis incorporating this change are coded.

431-3 Code F and later

432-3 Code H and later

431-5 Code B

SERVICE HINT

In some chassis, sound trouble may be experienced in the form of weak audio, buzz or distortion. If realignment does not cure the trouble, try reversing the primary connections to the sound take-off coil (L21).

TUBE CHANGE

V12, horizontal output tube changed from a 12CU6 to a 12DQ6.

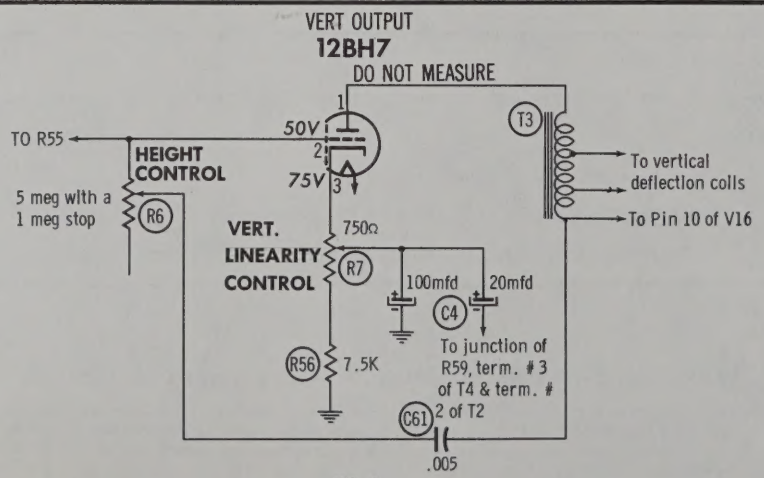


FIG. 1

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 232

SPARTON MODELS 39312, 39313, 40312, 40313, 41322, 41323, 42322, 42323, 43342, 44342, 47352, 47353, 48352, 48353 (Ch. 27D214, 29U214)

Sparton Models 22312, 22313, 23322 and 23323 (Ch. 29U213) were covered in Photofact Folder 8 - Set 232.

Following is a list of models and chassis used in each, which are electrically identical to the models covered, except for certain changes which will be given later in this bulletin.

MODEL	CHASSIS	MODEL	CHASSIS
39312	27D214	42323	29U214
39313	27D214	43342	27D214
40312	29U214	44342	29U214
40313	29U214	47352	27D214
41322	27D214	47353	27D214
41323	27D214	48352	29U214
42322	29U214	48353	29U214

Chassis 29U214 is electrically identical to chassis 29U213, except for the following:

A .047MFD capacitor is added from the center arm of the brightness control (R18) to ground

The picture tube, V29, is changed to a 21EP4A.

The focus control (R4) is omitted.

T1, power transformer, changed to part #AB44032-1.

Chassis 27D214 is electrically identical to chassis 29U214, except the UHF tuner is omitted.

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 283

REGENCY MODEL TR-1

Regency model TR-1 was covered in Photofact Folder 10 - Set 283.

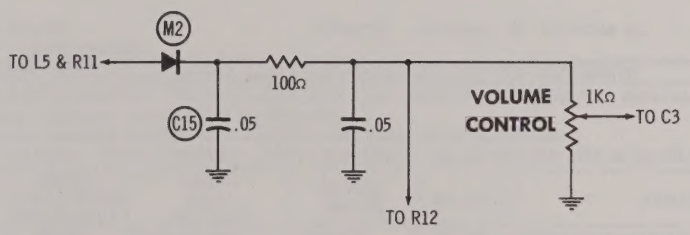
The following production changes were made after serial number 105,500 to improve performance.

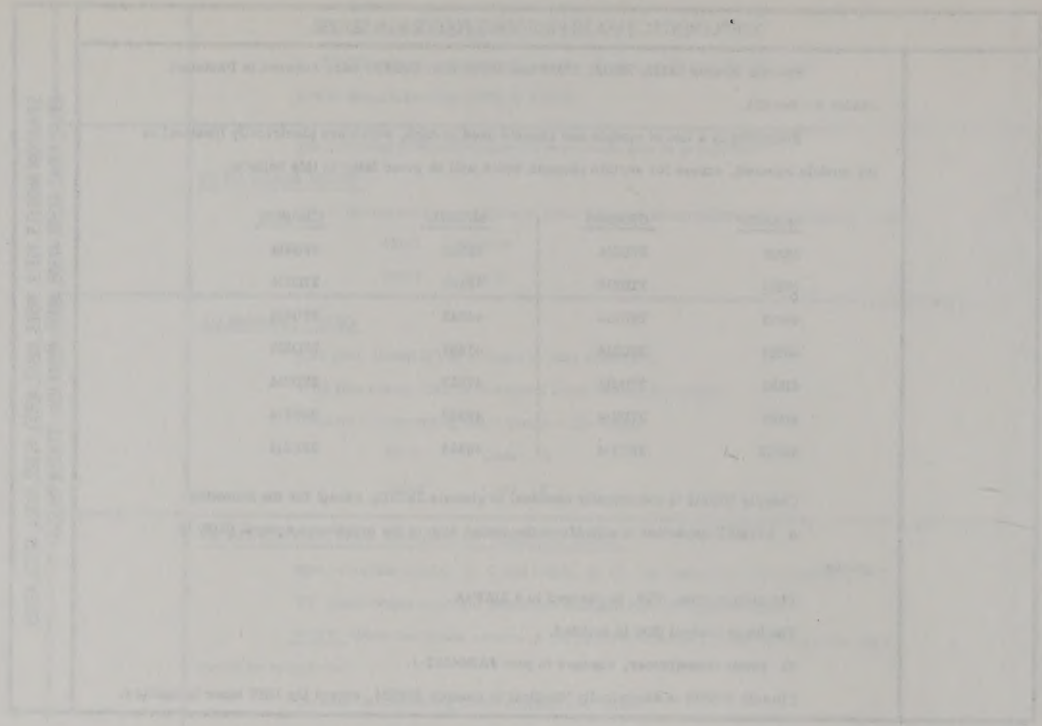
R2 is decreased from 470KΩ to 100KΩ.

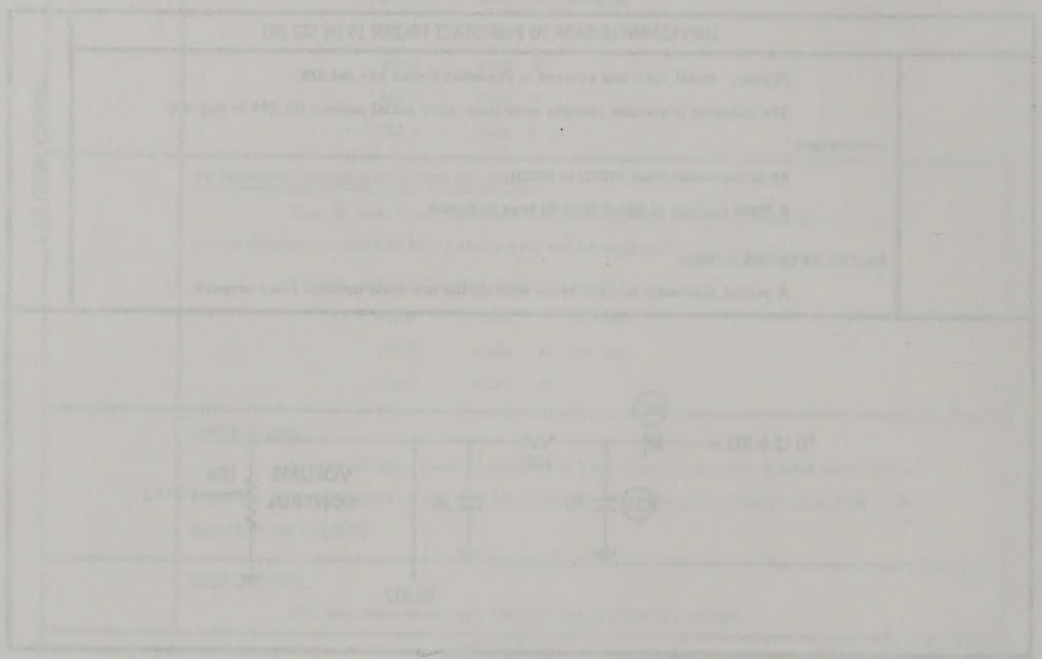
A 56KΩ resistor is added from X1 base to ground.

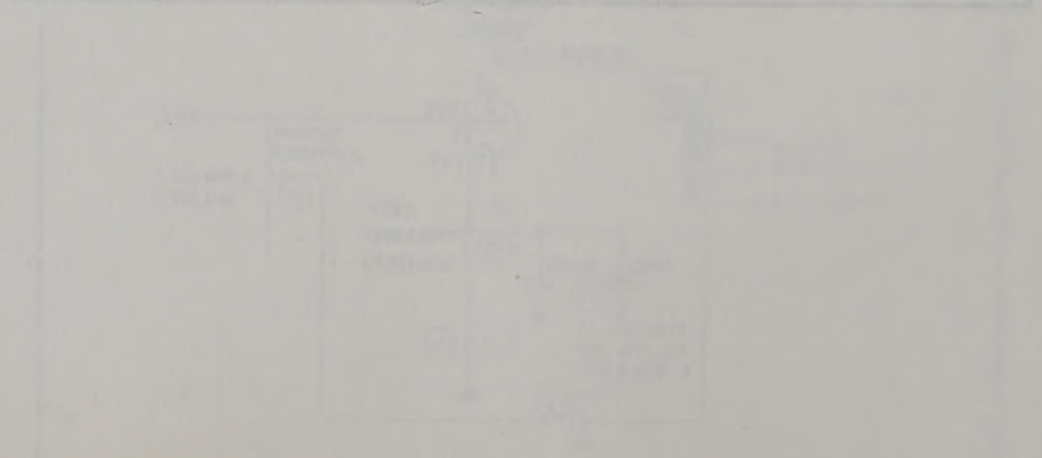
FILTER NETWORK ADDED

A partial schematic is given below showing the new diode detector filter network.

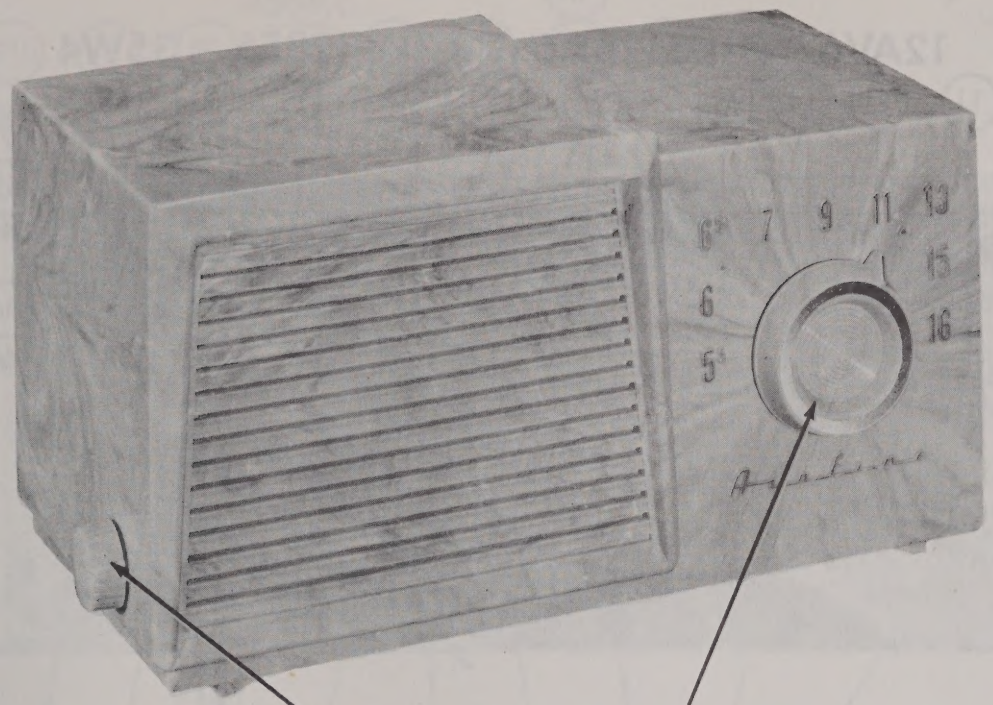








AIRLINE
MODELS GSE-1620A, -1621A, -1622A



ON-OFF SWITCH VOLUME CONTROL

TUNING

AIRLINE
MODELS GSE-1620A, -1621A, -1622A

TRADE NAME	Airline Models GSE-1620A, GSE-1621A, GSE-1622A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540KC-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.02MFD	High side to antenna stator lug. Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop (Radiated)	1620KC	1620KC	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A5	"

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PARTS LIST AND DESCRIPTIONS

AIRLINE
MODEL GSE-1620A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	AIRLINE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	MW25E24	PRS150V5050	BBRD5515	TCD49	TDL-D50-150	MTD-1550	TVA-2453
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	200		MW23E4000-29	SI200	D6-201	TP38	GP2K-201	UC-532	5GA-T2	
C3	.047	200		BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C4	30		† MW23E2022-4	† PA446					† 100C5	
C5A	220									
B	5000									
C	5000		♦ MW23E2041-6	♦PA-113-2	♦PC-151	♦116TM2	♦1408-02		♦DT-2	
D	250									
E										
C6	10000		MW23E4004-17	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C8	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

† Items C4 and R2 are combined in one unit.
♦ Items C5A, C5B, C5C, C5D, C5E, R7A, R7B, and R7C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½	28E105	AB-60	A47-500K-Z	Q13-133	U-48	Volume-Note 1
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	SWE-12	US-26	Attach to R1A.

Note 1. Some versions may use an alternate control Part No. MW28E105.

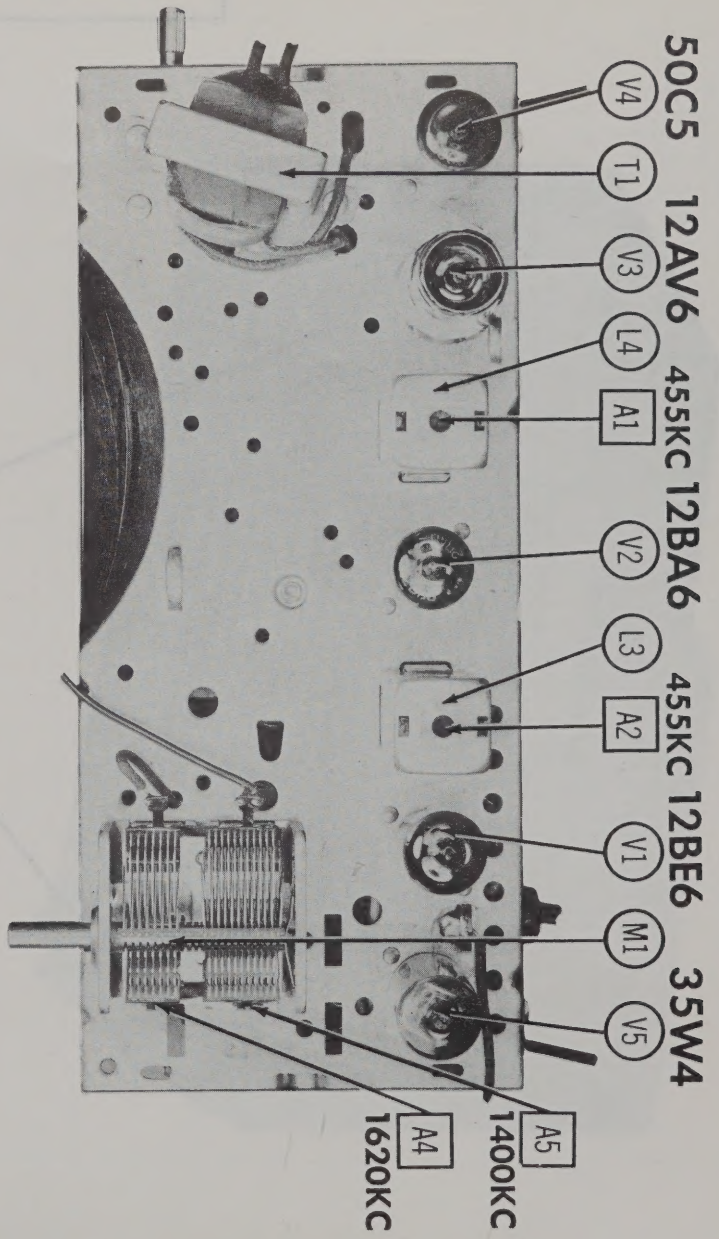
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R2	22KΩ	½	†MW23E2022-4	BTS-22K	
R3	1Meg	½		BTS-1Meg	
R4	68Ω	½		BTS-68	
R5	3.3Meg	½		BTS-3.3Meg	
R6	47KΩ	½		BTS-47K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R7A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦MW23E2041-6	BTS-470K	
C	470KΩ			BTS-470K	
R8	150Ω	½		BTS-150	
R9	1200Ω	1		BTA-1200	
R10	33Ω	½		BTS-33	

† Items R2, C4 are combined in one unit.
♦ Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRLINE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.75KΩ	3-4Ω	MW22E88	Z1101	A-3025	A-3332	26S58	S-12X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	1E55	4A07	223S1	

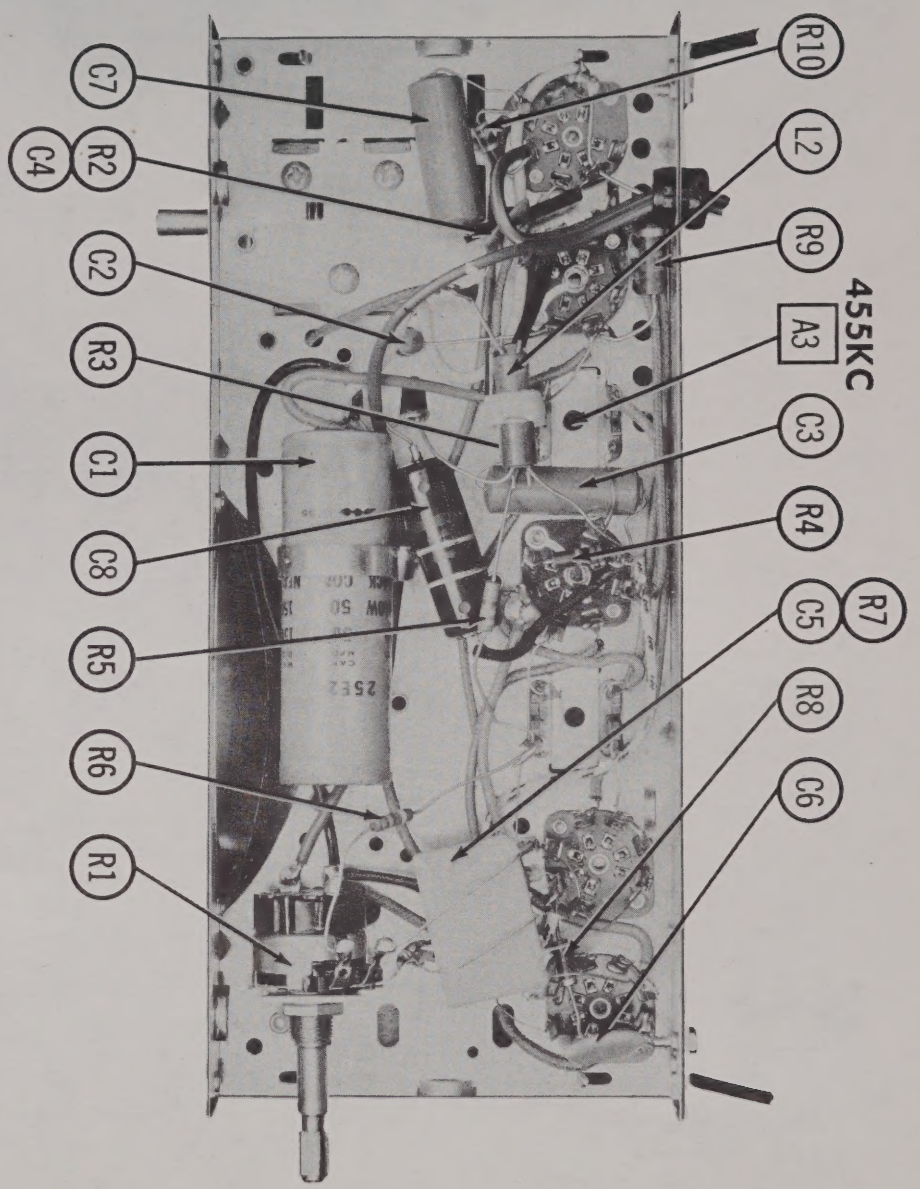
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.6Ω		MW20E942-2				Includes cabinet back
L2	Osc. Coil	1.1Ω	10.5Ω	MW20E938				
L3	Input IF	15Ω	15Ω	MW20E732	16-6758	BC-352	12-C1	
L4	Output IF	34Ω	16Ω	MW20E997				

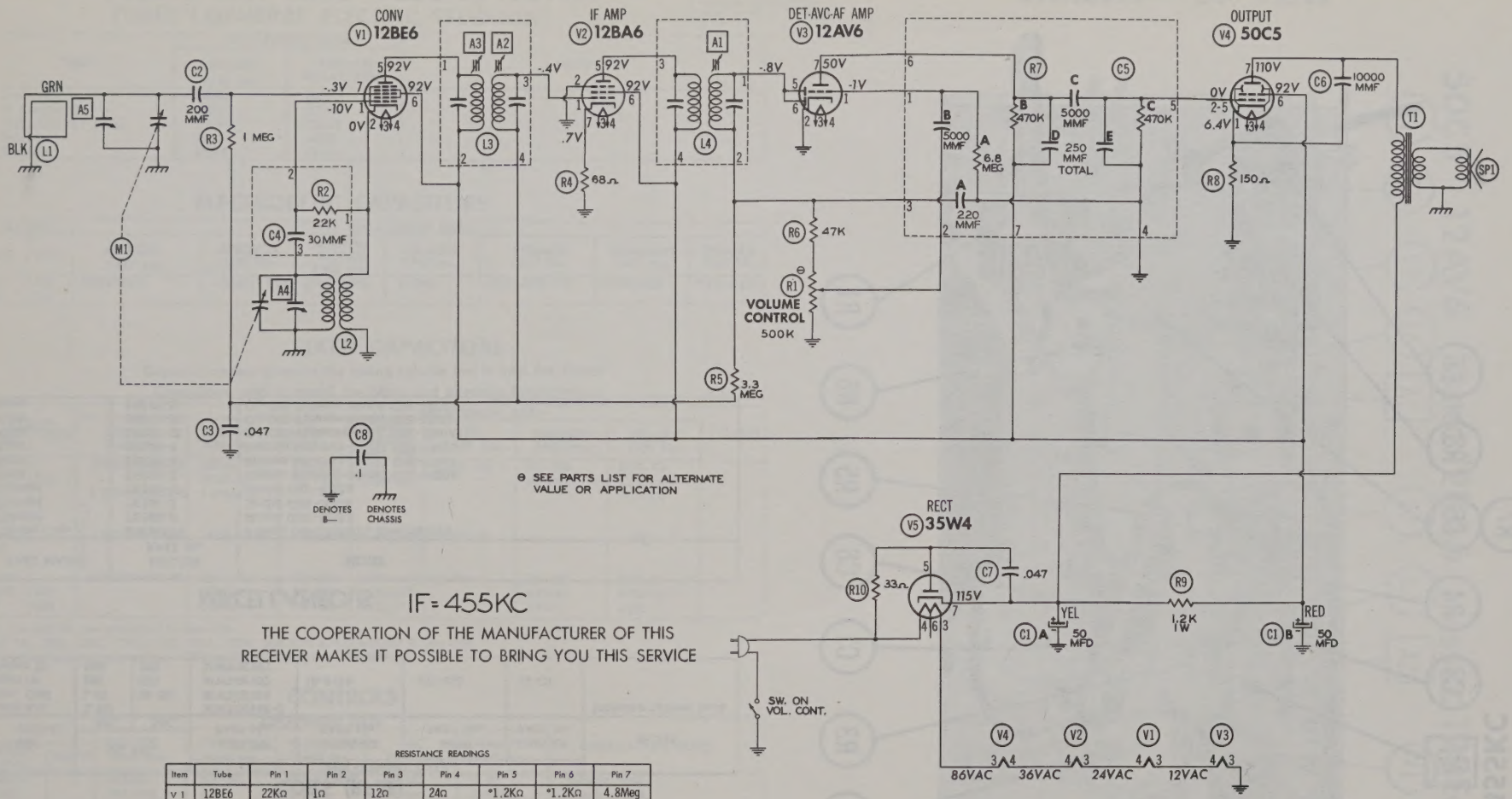
MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M1	Tuning Cap.	MW24E64	2 Gang (14-315MMF, 12-105MMF)
	Cabinet	7E398-8	Model GSE-1620A
	Cabinet	7E398-9	Model GSE-1621A
	Cabinet	7E398-10	Model GSE-1622A
	Knob	35E38-2	Station Selector-Model GSE-1620A
	Knob	35E38-8	Station Selector-Model GSE-1621A
	Knob	35E38-4	Station Selector-Model GSE-1622A
	Knob	35E47-13	On-Off-Volume-Model GSE-1620A
	Knob	35E47-28	On-Off-Volume-Model GSE-1621A
	Knob	37E47-15	On-Off-Volume-Model GSE-1622A

CHASSIS—BOTTOM VIEW



AIRLINE
MODEL GSE-1620A



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1Ω	12Ω	24Ω	*1.2KΩ	*1.2KΩ	4.8Meg
V 2	12BA6	3.8Meg	0Ω	24Ω	36Ω	*1.2KΩ	*1.2KΩ	68Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	550KΩ	550KΩ	*470KΩ
V 4	50C5	150Ω	470KΩ	86Ω	36Ω	470KΩ	*1.2KΩ	*220Ω
V 5	35W4	NC	TP	86Ω	120Ω	153Ω	115Ω	500KΩ

* - MEASURED FROM PIN 7 OF V5.
NC - NO CONNECTION.
TP - TIE POINT.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

CBS-COLUMBIA MODEL 3T615

TRADE NAME	CBS-Columbia	MODELS	CHASSIS
		U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636	1610
		3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624, 3C627, 3C628, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636	1611
MANUFACTURER	CBS-Columbia, A Division of Columbia Broadcasting System, Inc., 48-50 34th. St., Long Island City, N.Y.		
TYPE SET	Television Receiver		
TUBES	Sixteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.2 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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Tube Placement Chart (Bottom View) 8

Tube Placement Chart (Top View) 5

CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)

PROPERTY OF
L. F. BLANKENSHIP
3921 MEADE ST.
DENVER, COLORADO

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BLANKENSHIP
MEADE ST.
VER, COLORADO

CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)

DISASSEMBLY INSTRUCTIONS

Servicing of tubes may be made by removing rear cover and 2 wing screws from lower right and left hand chassis support brackets and pull the top of the chassis back into the tube servicing position.

CHASSIS REMOVAL

1. Remove 10 metal screws. Remove rear cover.
2. Remove 6 metal screws. Remove chassis bottom cover.
3. Disconnect speaker leads.
4. Remove 6 metal screws from chassis bottom pan.
5. Lift cabinet from chassis bottom pan.
6. Remove 2 speaker nuts. Remove speaker.

MODELS	CHASSIS
U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636	1610
3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624, 3C627, 3C628, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636	1611

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be made thru hole in chassis bottom pan. Align tool must be inserted in hole at a 45 degree angle.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on the rear side of the chassis. Set the horizontal hold control to the center of its range and adjust the horizontal frequency slug (L27) until the picture is synchronized horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R6) located on the rear side of the chassis for maximum sound and minimum buzz.

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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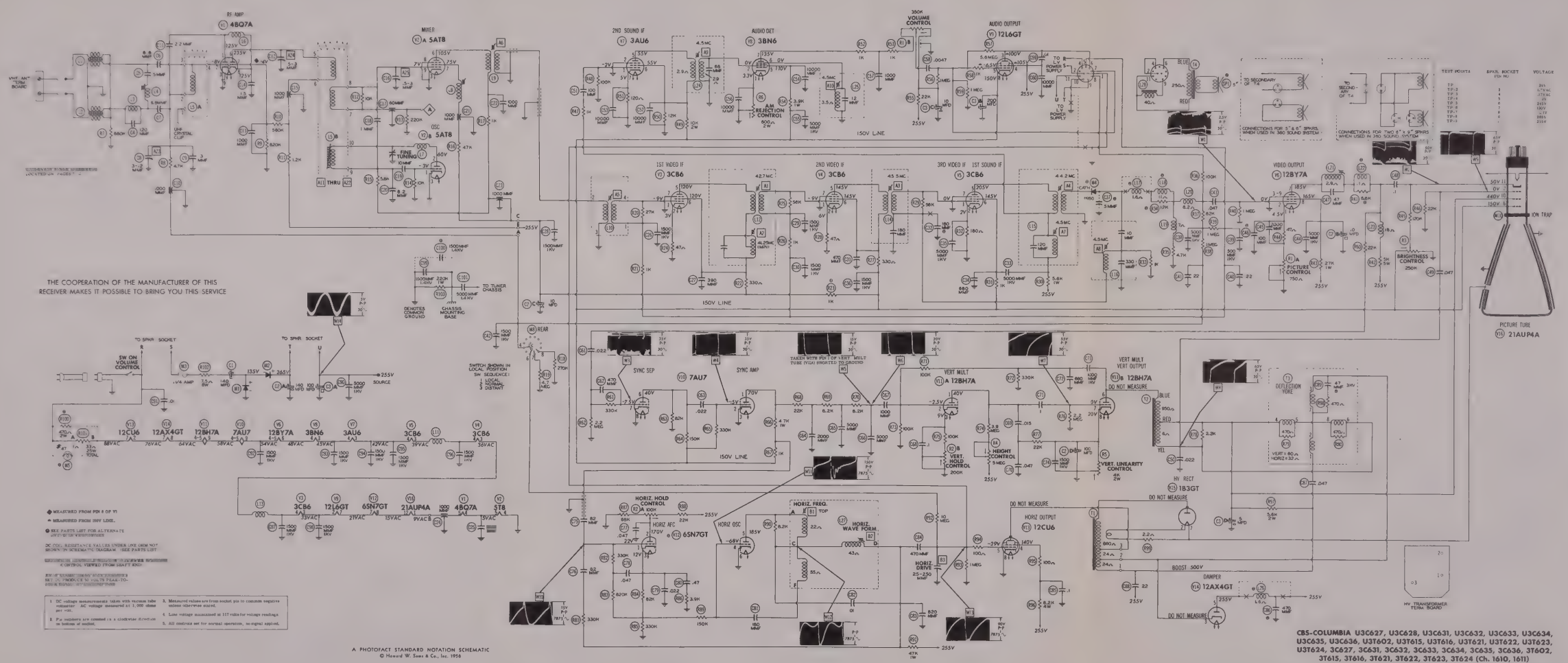
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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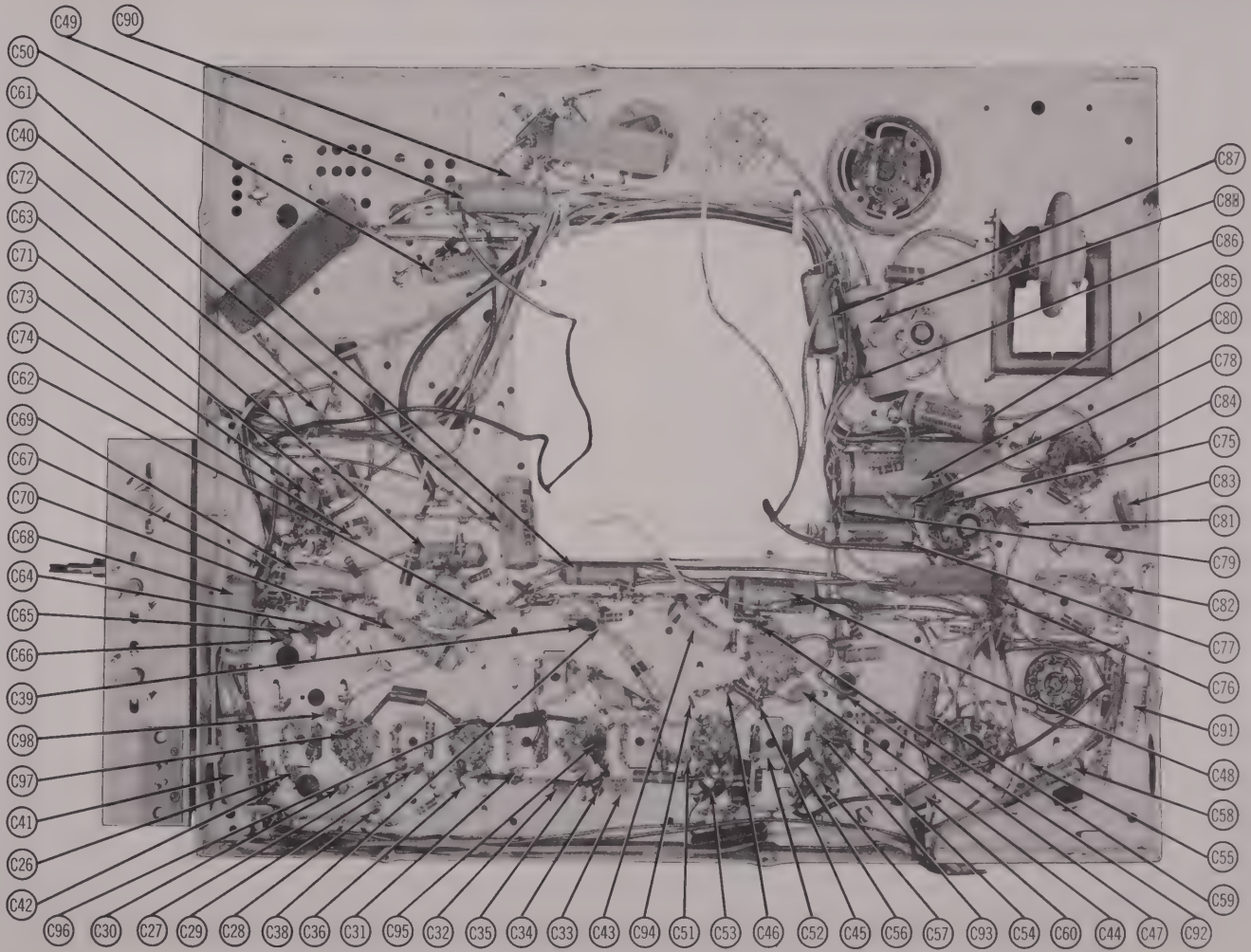
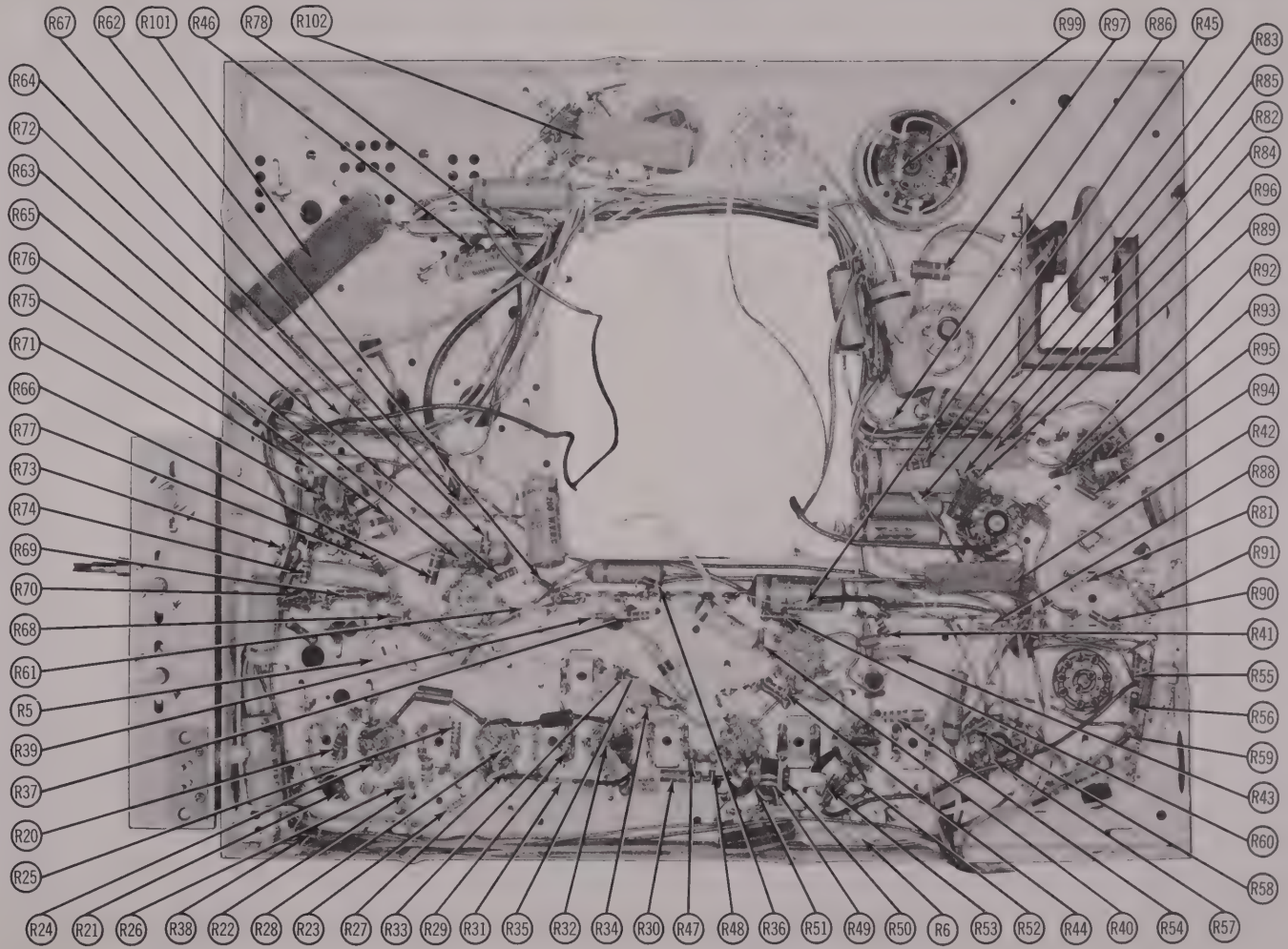
CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

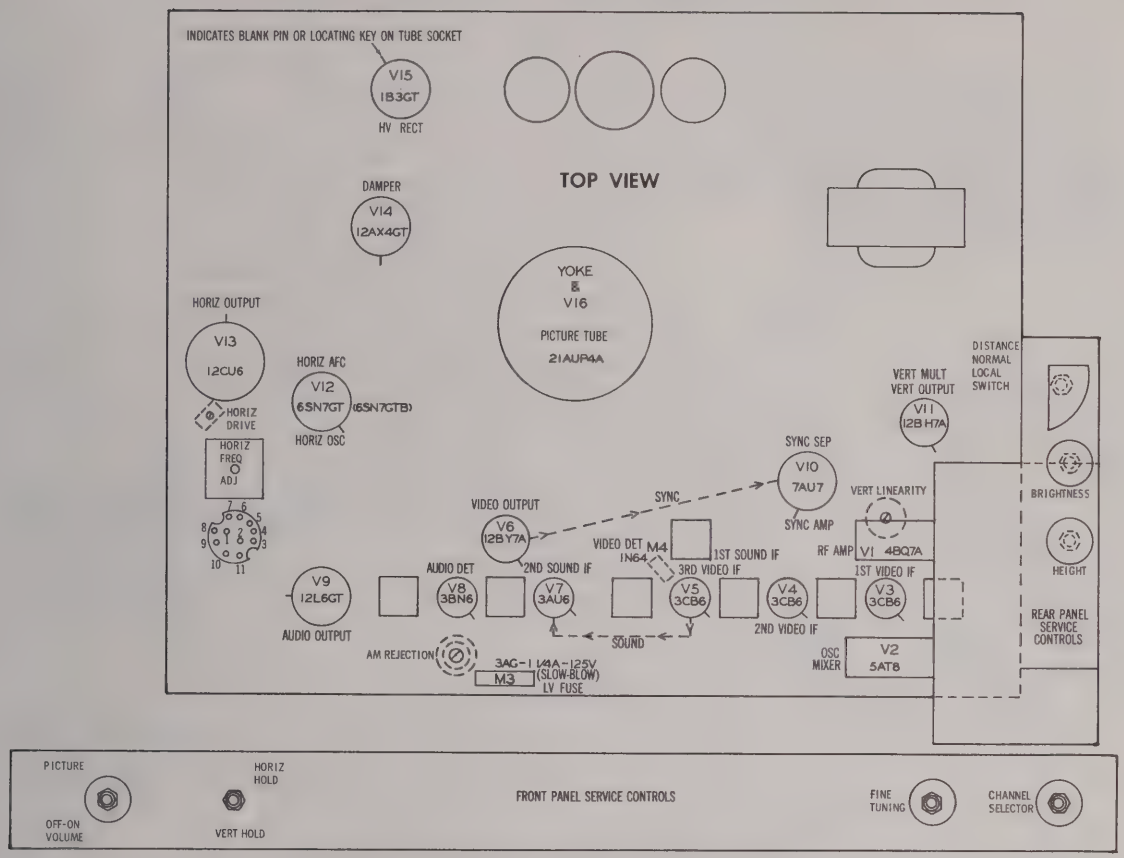
CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T631, 3T622, 3T623, 3T624 (Ch. 1610, 1611)



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

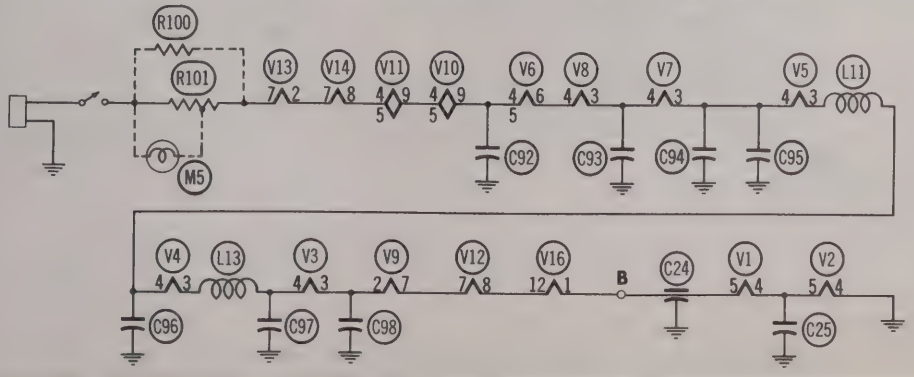
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2) Fuse (M3)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V9
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V16
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V10, V11
No horiz. sync - V10, V12
No vert. or horiz. sync - V10

SWEEP FAILURE
No raster, has sound - V12, V13, V14, V15, V16
No vertical deflection - V11
Poor vert. linearity or foldover - V11
Poor horiz. linearity or foldover - V12, V13, V14
Narrow picture - V12, V13, V14, V15, M1, M2
Vert. off freq. - V10, V11
Horiz. off freq. - V10, V12

NOTE: Since this receiver employs tubes used in a series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



SET 317 FOLDER 3

CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by disconnecting the ground lead from the cathode (pin 8) of the 12CU6 horizontal output tube.

VIDEO IF ALIGNMENT

Set local-distant switch to normal position.
Connect the negative lead of a 3 volt bias supply to the ungrounded side of C40. Positive lead to chassis.
Use lowest possible range of VTVM for all steps.
Remove channel 13 oscillator strip from tuner.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 of V3. Low side to chassis	42. 7MC	13	DC probe to pin 8 of test socket. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	41. 25MC	"	"	A2	Adjust for MINIMUM deflection.
3.	"	"	45. 5MC	"	"	A3	Adjust for maximum deflection.
4.	"	"	44. 2MC	"	"	A4	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Attenuate sweep generator output to maintain 3 volt peak to peak vertical deflection on the scope.
Leave bias connect to the ungrounded side of C40.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to ungrounded tube shield floating over osc.-mixer tube. Low side to chassis.	43MC (10MC Swp.)	42. 45MC 45. 75MC	13	Vert. Amp. to pin 8 of test socket. Low side to chassis.	A5, A6	Adjust A5 and A6 to place markers in position as in Fig. 1. If necessary, retouch A1, A3 and A4 for correct response as in Fig. 1.

SOUND IF ALIGNMENT

Increase bias supply to 6 volts and set the local-distant switch to local position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.01MFD	High side to junction of L18 and L19. Low side to chassis.	4. 5MC (400∿ AM 30% Mod.)	13	Across audio output transformer secondary.	A7, A8, A9	Adjust for maximum deflection.
7.	"	"	4. 5MC (25KC FM.)	13	"	A10	Set volume control to approximate center. Adjust A10 for maximum deflection of meter.
8.	"	"	4. 5MC (400∿ AM 30% Mod.)	13	"	R6	Adjust for MINIMUM deflection. Repeat step 7.

ALTERNATE SOUND IF ALIGNMENT USING ON THE AIR TV SIGNAL

1. Tune the receiver to a strong TV signal and adjust controls for best picture. Set "AM Rejection" control at the center of its range. Attenuate signal (remove antenna and/or set local distant switch to local position) until a hiss is heard in the sound. Adjust A7, A8 and A9 for maximum sound.
2. Increase signal level to normal and adjust A10 for maximum sound and minimum buzz.
3. Attenuate signal again and adjust buzz control (R6) for minimum hiss and noise.
4. Increase signal level to normal and rotate the fine tuning control. If buzz is still present, readjust A10 for clearest sound and minimum buzz.

OSCILLATOR ALIGNMENT

Replace channel 13 oscillator strip in tuner.
The oscillator adjustment screws are accessible thru a hole in the bottom of the chassis mounting pan. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistor	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	Vert. Amp. to pin 8 of test socket. Common to chassis.	A11	Adjust to place sound marker in trap notch and video marker at 50% as in Fig. 2.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A12	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A13	
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10		A14	
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9		A15	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A16	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A17	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A18	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A19	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A20	
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A21	
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2		A22	

ALIGNMENT INSTRUCTIONS (cont)

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to the ungrounded side of C40. The positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp.)	205. 25MC 209. 75MC	12	Vert. Amp. thru 22KΩ to point (A). Low side to chassis.	A23, A24, A25	Adjust for response curve similar to Fig. 2. with markers above 90%.
11.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		Check for response similar to Fig. 2. If marker falls below 70% on any channel, make SLIGHT compromise adjustment of A23, A24, and A25 with channel selector set to that channel. Recheck all other channels to make sure that they have not been seriously affected.
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

UHF TUNER ALIGNMENT

The UHF tuner portion of this receiver has been properly aligned at the factory and is very stable. Alignment of the UHF portion is not recommended in the field.

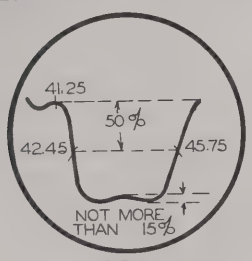


FIG. 1

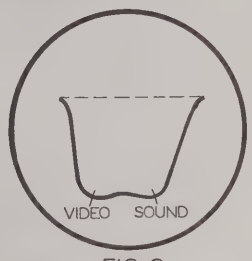
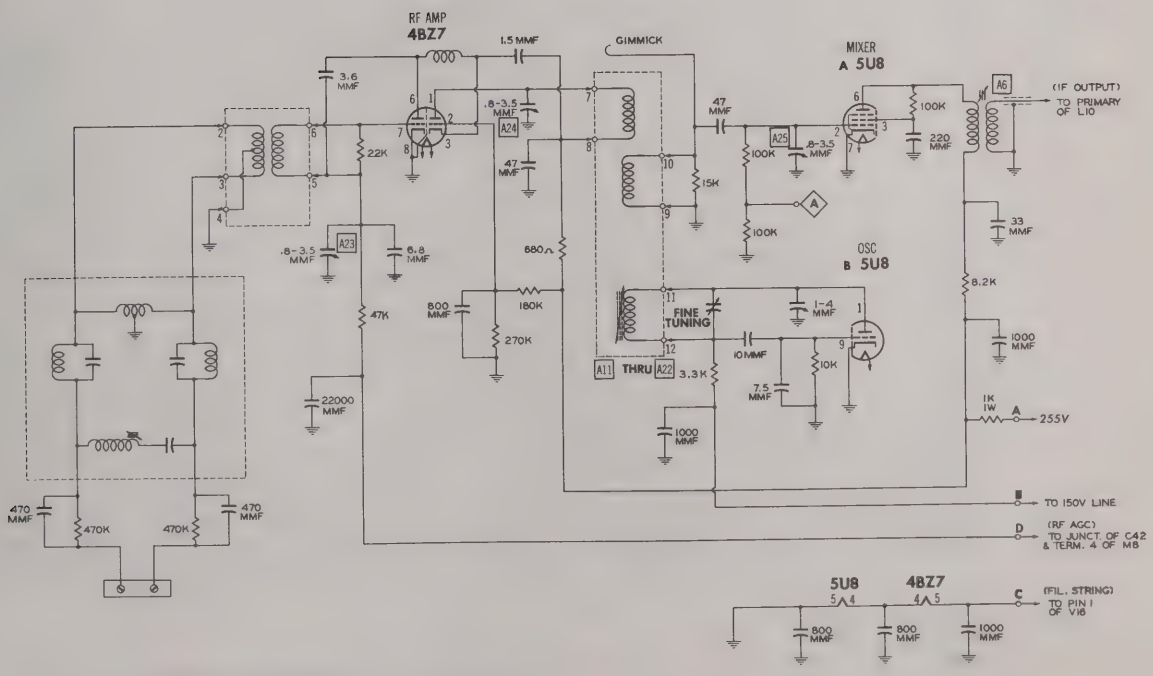


FIG. 2



ALTERNATE VHF TUNER 6900071I USED WITH CHASSIS 1611

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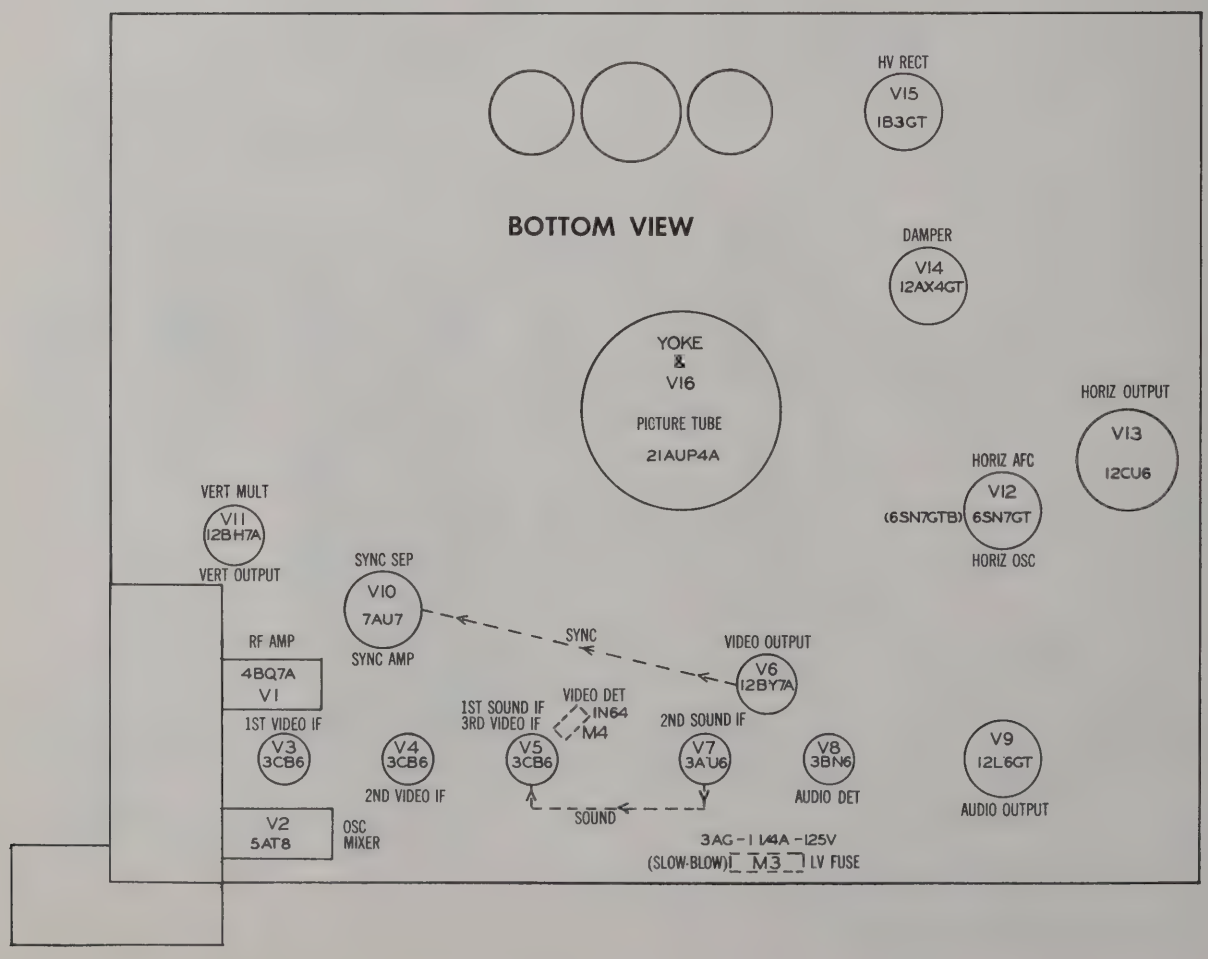
ALTERNATE VHF TUNER SCHEMATIC

CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	INF	850KΩ	0Ω	1Ω	2Ω	† 1.2KΩ	350KΩ	INF	0Ω
V 2	5AT8	10KΩ	■ 5.7KΩ	0Ω	0Ω	1Ω	■ 2KΩ	■ 47KΩ	0Ω	220KΩ
V 3	3CB6	1Meg	47Ω	8Ω	9Ω	■ 1.3KΩ	■ 1.3KΩ	0Ω		
V 4	3CB6	1Meg	47Ω	9Ω	10Ω	■ 330Ω	■ 330Ω	0Ω		
V 5	3CB6	1KΩ	180Ω	10Ω	11Ω	† 5.6KΩ	■ 1KΩ	0Ω		
V 6	12BY7A	250Ω	1Meg	0Ω	14Ω	14Ω	13Ω	† 5KΩ	† 27KΩ	0Ω
V 7	3AU6	100KΩ	0Ω	11Ω	12Ω	■ 10KΩ	■ 10KΩ	120Ω		
V 8	3BN6	300Ω	2.9Ω	12Ω	13Ω	■ 3.9KΩ	3.5Ω	† 350KΩ		
V 9	12L6GT	TP	8Ω	† 300Ω	† 40Ω	450KΩ	TP	5Ω	20KΩ	
V 10	7AU7	■ 7KΩ	330KΩ	0Ω	15Ω	15Ω	■ 60KΩ	2.5Meg	0Ω	14Ω
V 11	12BH7A	† 5Meg	80KΩ	130KΩ	16Ω	16Ω	▲ 6.6KΩ	2.2Meg	1.3KΩ	15Ω
V 12	6SN7GT	1.5Meg	† 40KΩ	400KΩ	480KΩ	† 47KΩ	0Ω	5Ω	4Ω	
V 13	12CU6	TP	17Ω	TP	† 8.2KΩ	1Meg	TP	20Ω	0Ω	TOP CAP ▲ 24Ω
V 14	12AX4GT	NC	NC	200KΩ	NC	† 40Ω	NC	17Ω	16Ω	
V 15	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 885Ω
V 16	21AUP4A	2Ω	22KΩ	PIN 6 ■ 1KΩ	PIN 10 ▲ 5.6KΩ	PIN 11 ■ 150KΩ	PIN 12 4Ω			

† MEASURED FROM OUTPUT OF M2.
■ MEASURED FROM 150V LINE.
▲ MEASURED FROM PIN 3 OF V14.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

ALTERNATE VHF-UHF TUNER SCHEMATIC
CBS-COLUMBIA U3C627, U3C628, U3C631, U3C632, U3C633, U3C634, U3C635, U3C636, U3T602, U3T615, U3T616, U3T621, U3T622, U3T623, U3T624, 3C627, 3C631, 3C632, 3C633, 3C634, 3C635, 3C636, 3T602, 3T615, 3T616, 3T621, 3T622, 3T623, 3T624 (Ch. 1610, 1611)
UHF TUNER PART NO. 69000701, AND VHF TUNER PART NO. 69000692 USED WITH CHASSIS 1610
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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RF AMP 4BZ7
MIXER A 5U8
OSC B 5U8
UHF OSC 2AF4A
5U8
4BZ7
FINE TUNING
THRU
GIMMICK
UHF TUNER POWER PLUG & SOCKET
41 MC UHF IF STRIP
VHF ANT. TERM. BOARD
UHF ANT. TERM. BOARD
(IF OUTPUT) TO PRIMARY OF L10
(RF AGC) TO JUNCT. OF C42 & TERM. 4 OF M8
TO 150V LINE
(FIL. STRING) TO PIN 1 OF V16
255V
IN82A

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: CBS-Columbia PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier		6BQ7A	6BQ7A
V2	Mixer-Oscillator		5AT8	5AT8
V3	1st. Video IF Amplifier		3CB6	3CB6
V4	2nd. Video IF Amplifier		3CB6	3CB6
V5	3rd. Video IF Amplifier-1st. Sound IF Amplifier		3CB6	3CB6
V6	Video Output		12BY7A	12BY7A
V7	2nd. Sound IF Amplifier		5AU8	5AU8
V8	Audio Detector		3BN6	3BN6
V9	Audio Output		12LG7	12LG7
V10	Sync Separator-Sync Amp.		7AU7	7AU7
V11	Vert. Mult.-Vert. Output		12BH7A	12BH7A
V12	Horiz. AFC-Horiz. Osc.		6SN7GT	6SN7GT
V13	Horiz. Output		12CU6	12CU6
V14	Damper		1A3/6X5GT	1A3/6X5GT
V15	HV Rectifier		1B3GT	1B3GT

6SN7GTB may be used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: CBS-Columbia PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V16	21AUP4A ①	21AUP4A ①	21AUP4A ①	21AUP4A ①	① Aluminized ② Silver screen "SS"
			21AUP4A/B ①	21AUP4A ① ② 21AUP4A ②	
			21AUP4	21AUP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	VOLT	CBS-Columbia PART No.	REPLACEMENT DATA: AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	300	21000681	H4A3X15	XA007	FP131	TM-150-350	S-150	TVL-1540
C2A	140	300	21001131			FP451.3 VC43		Q-223 MTD-4510	
B	240	300							
C	410	150							
D	100	25							
C3A	2100	300	21001121			FP384.14 VC83	TM-4141	Q-163 LB-310	TVL-4561 LVA-1903
B	200	150							
C	10	300							
D	8	500							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	CBS-Columbia PART No.	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	120			BPD-00012	D8-121	G044	GP2K-121	GC4-5312	5GA-T22	
C5	5			NPO-D15	TCZ-4R7	Z011	NPOA-050	ZT-555	5TCCB-V47	
C6	6.8			NPO-D26.8	TCZ-6R8	Z013	NPOA-6R8	ZT-5568	5TCCB-V68	
C7	6.8			NPO-D26.8	TCZ-6R8	Z013	NPOA-6R8	ZT-5568	5TCCB-V68	
C8	3-15									
C9	3			NPO-D33	TCZ-3R3	Z007	NPOA-030	ZT-553	5TCCB-V33	
C10	1000									
C11	2.2			NPO-S22.2	TCZ-2R2	Z006	NPOA-2R2			
C12	1-3				SZB-3		31L5-01-0R5	C7565A	5-TVC-3	
C13	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C14	1.5			NPO-S1.5	TCZ-1R5	Z004	NPOA-1R5	ZT-5515	5TCCB-V15	
C15	1000									
C16	5-3				SZB-3		31L5-01-0R5	C7565A		
C17	60									
C18	1			NPO-S1	TCZ-1	TZ03	NPOA-010		5TCCB-V1	
C19	15									
C20	8.2									
C21	1000									
C22	1000			BPD-001	DD-103	K069	801-001	DC-521	5HK-D1	
C23	1000									
C24	1000									
C25	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C26	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C27	390		23003190	S1390	D6-391		GP4K-391	UC-5339	5GA-T39	
C28	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C29	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C30	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C31	470		23004700	S1470	D6-471	T945	GP2K-471	UC-5347	5GA-T47	
C32	180			S1180	D6-181		GP2K-181	UC-5338	5GA-T18	Note 1
C33	5600	1000	23046580	HVD-15-4700	DD-502	VD47	1R5KV-472		16HK-D47	
C34	680		23004720	S1680	D6-681	T950	GP2K-681	UC-5368	5GA-T68	
C35	5600	1000	23046580	HVD-15-4700	DD-502	VD47	1R5KV-472		16HK-D47	
C36	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C37	5		23001890	S15	D6-050	T906	GP2K-050	ZT-555	5GA-Y5	Note 2
C38	5000	1000	23046480	HVD-15-4700	DD-502	VD47	1R5KV-472		16HK-D47	
C39	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C40	33	200	23011230	P33BN-22		CUBP22		PT4622	2TM-P22	
C41	22	200	23011230	P22BN-22		CUBP22		PT4622	2TM-P22	
C42	1500	1000	23046540	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C43	.047	300	23012140	P33BN-047	DP-503	CUBS47		PT4147	2TM-S47	
C44	5000	1000	23046480	HVD-15-4700	DD-502	VD47	1R5KV-472		16HK-D47	
C45	2000		23000590	S2000	D6-202	T916	GP2-333-202	UC-522	5HK-D2	
C46	100		23001830	S100	D6-101	T934	GP2K-101	UC-521	5GA-T1	Note 3
C47	47			S47	D6-470	T931	GP2K-470	UC-5447	5GA-Q47	
C48	.1	400	23011780	P488N-1	DF-104	CUBP1		PT401	4TM-P1	
C49	.047	600	23012340	BPD-05	DF-503	CUBS47		PT4147	6TM-S47	
C50	.022	600	23012320	BPD-05	DF-223	CUBS22	817-05	PT4122	6TM-S22	
C51	100		23001820	S100	D6-101	T934	GP1K-101	UC-521	5GA-T1	
C52	10000		23056020	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C53	10000		23056020	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C54	10000		23056020	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C55	5000	1000	23046480	HVD-15-4700	DD-502	VD47	1R5KV-472		16HK-D47	
C56	10000		23056020	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C57	1000		23001740	BPD-001	DD-103	K069	801-001	DC-521	5HK-D1	
C58	.0047	600	23011820	S4700	D6-472	CUBS47	GP3-333-472	PT5347	6TM-D47	
C59	.01	400	23001560	BPD-01	D6-103	CUBS31	GP3-333-103	PT431	4TM-S1	
C60	10000		23056020	BPD-01	DD-103	K083	811-01	DC-511	5HK-E1	
C61	.033	400	23011700	BPD-03	DD-303	CUBS422	817-03	PT4123	4TM-S33	
C62	470		23002300	S470	D6-471	T945	GP2K-471	UC-5347	5GA-T47	
C63	.033	400	23011700	BPD-03	DD-303	CUBS422	817-03	PT4123	4TM-S33	
C64	3000		23000581	S3000	D6-302	T956	GP2-333-302	UC-522	5HK-D2	
C65	5000		23000601	S5000	D6-502	T964	GP2-333-502	UC-525	5HK-D5	
C66	5000		23000600	S5000	D6-502	TP94	GP2-333-502	UC-525	5HK-D5	
C67	1000		23001240	S1000	D6-102	T932	GP2L-102	UC-521	5HK-D1	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	CBS-Columbia PART No.	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C68	.1	300	23011280	P288N-1	DP-104	CUBP1		PT401	2TM-P1	
C69	.015	600	23009880							
C70	.047	400	23008340							
C71	.1	400	23008280	P488N-1	DP-104	CUBP1		PT401	4TM-P1	
C72	680		23001730	S680	D6-681	T950	GP2K-681	UC-5368	5GA-T68	
C73	1000	1000	23056070	HVD-15-1000	DD-102	VD1	1R5KV-102	DC3021	10GA-D1	
C74	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C75	82	500	23007010	1469-000082	TCZ-82	5R5Q82	NPO-337-820	MB-462		
C76	82	500	23007010	1469-000082	TCZ-82	5R5Q82	NPO-337-820	MB-462		
C77	.047	400	23008340	BPD-05	DF-503	CUBS47		PT4147	4TM-S47	
C78	.047	300	23012140	BPD-05	DF-503	CUBS47		PT4147	2TM-S47	
C79	.023	400	23008300	BPD-03	DD-303	CUBS423	817-03	PT4123	4TM-S23	
C80	.47	300	27007840	P388N-47		CUBS47		PT4047	2TM-P47	
C81	180	500	23007090	NPO-S180	TCZ-180	5R5T18	NPO-334-181	MCZ137	MB-318	
C82	.01	300	27014580							
C83	820	500	23007370	1464-00082		1R5T82			MB-382	
C84	470		23002300	S1470	D6-471	T946	GP2K-471	UC-5347	5GA-T47	
C85	.1	400	23011780	P488N-1	DP-104	CUBP1		PT401	4TM-P1	
C86	470		23002300	S1470	D6-471	T946	GP2K-471	UC-5347	5GA-T47	Note 1
C87	.047	200	23007740	BPD-05	DF-503	CUBS647		PT4147	2TM-S47	
C88	.22	400	23008330	P488N-22		CUBP223		PT4023	4TM-P23	
C89	47		3000	HVD-20-47	DD30-470	VD047	3EV-470	DC30447	30GA-D-047	Note 4
C90	5000	1000	23056680	HVD-15-4700	DD-502	VD47	1R5KV-472		10HKB-D47	
C91	.01	600	23017680	BPD-01	D6-103	CUBS31	GP3-333-103	PT431	6TM-S1	
C92	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C93	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C94	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C95	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C96	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C97	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C98	1500	1000	23056440	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C99	1500	1400	23067010	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	
C100	1500	1400	23067030	HVD-15-1500	DD-152	VD15	1R5KV-152	DC30215	10GA-D15	Note 1
C101	5000	1400	23067030	HVD-15-4700	DD-502	VD47	1R5KV-472		20HKB-D5	

Note 1. Not used in some chassis.
Note 2. Not used in chassis 181.
Note 3. Some versions use 220MMFD in this application.
Note 4. Some versions use 56MMF in this application.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	CBS-Columbia PART No.	REPLACEMENT DATA: CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1500		38001431				UK48	Picture (Panel)
B	350Ω							Volume & Switch (Rear)
R2A	100Ω		38001431	F1-31		∗ QJ-890	UF15L	Horizonal Hold (Panel)
B	100Ω			R2-33			UF25AL	Vertical Hold (Rear)
R3A	250Ω		38001461	AB-50	A47-250K-S	QU1-130	TA35AL	Brightness
B	Short		Not Req.	AK-4	R33-3	Not Req.	Not Req.	Attach to R3A.
R4A	5Meg		38001471	AB-37	A47-5Meg-S	QU1-141	TA56L	Height
B	Short		Not Req.	AK-4	R5-2	Not Req.	Not Req.	Attach to R4A.
R5	4000Ω	2	38001281		39-4000-1000			Vertical Linearity (Wire Wound)
R6	400Ω	2	38001311		39-400			A. M. Rejection (Wire Wound)

† Universal Replacement (Mallory Exact Duplicate Part No. UK128G).
∗ Cinaudagraf Equivalent; K-15 EH, Base Elements & Shafts; BII-128 & P17-028 (Panel) BII-129 & R3-110 (Rear)

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: CBS-Columbia PART No.	IRC PART No.	NOTES
R7	680Ω	1	BTS-680K		
R8	4700Ω	1	BTS-4700		
R9	820Ω	1	BTS-820K		
R10	560Ω	1	BTS-560K		
R11	150Ω	1	BTS-150K		
R12	10Ω	1	BTS-10K		
R13	220Ω	1	BTS-220K		
R14	10Ω	1	BTS-10K		
R15	5600Ω	1	BTS-5600		
R16	47Ω	1	BTS-47R		
R17	1000Ω	1	BTS-1000		
R18	270Ω	1	30274230	BTS-270K	
R19	4.7Meg	1	30475230	BTS-4.7Meg	
R20	27Ω	1	30272230	BTS-27R	
R21	1000Ω	1	30102330	BTS-1000	
R22	330Ω	1	30331330	BTS-330	
R23	1000Ω	1	30331330	BTS-1000	Note 1
R24	47Ω	1	30470230	BTS-47	
R25	56Ω	1	30563230		
R26	1000Ω	1	30102330	BTS-1000	
R27	330Ω	1	30331330	BTS-330	
R28	47Ω	1	30470230	BTS-47	
R29	56Ω	1	30563230		
R30	5600Ω	1	30562340	BTA-5600	
R31	1000Ω	1	30102330	BTS-1000	
R32	180Ω	1	30181230	BTS-180	
R33	1000Ω	1	30102230	BTS-1000	
R34	12KΩ	1	30123230	BTS-12K	Note 2
R35	4700Ω	1	30472130	BTS-4700	
R36	1000Ω	1	30102430	BTS-1000	
R37	82KΩ	1	30823230	BTS-82K	
R38	1Meg	1	31005330	BTS-1Meg	
R39	1Meg	1	31005330	BTS-1Meg	
R40	1Meg	1	31005330	BTS-1Meg	
R41	5600Ω	1	30562330	BTS-5600	Note 3
R42	1000Ω	1	30102530	BTF-5002	
R43	27KΩ	1	30273240	BTA-27K	
R44	47Ω	1	30470230	BTS-47	
R45	120KΩ	1	30124230	BTS-120K	
R46	22KΩ	1	30223230	BTS-22K	
R47	100Ω	1	30102330	BTS-100	
R48	100KΩ	1	30104230	BTS-100K	
R49	10KΩ	1	30103230	BTS-10K	
R50	12KΩ	1	30123230	BTS-12K	
R51	12Ω	1	30121230	BTS-12Ω	
R52	1000Ω	1	30102330	BTS-1000	
R53	1000Ω	1	30102340	BTA-1000	
R54	330KΩ	1	30334230	BTS-330K	
R55	22KΩ	1	30223330	BTS-22K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: CBS-Columbia PART No.	IRC PART No.	NOTES
R56	1Meg	1	31005230	BTS-1Meg	
R57	5.6Meg	1	30565230	BTS-5.6Meg	
R58	1000Ω	1	30102230	BTS-1000	
R59	1Meg	1	31005230	BTS-1Meg	
R60	22KΩ	1	30223130	BTS-22K	
R61	330KΩ	1	30334230	BTS-330K	
R62	2.2Meg	1	30225130	BTS-2.2Meg	
R63	82KΩ	1	30823230	BTS-82K	
R64	150KΩ	1	30154230	BTS-150K	
R65	330KΩ	1	30334230	BTS-330K	
R66	4700Ω	1	30472240	BTA-4700	
R67	100KΩ	1	30102230	BTS-1000	
R68	22KΩ	1	30223230	BTS-22K	
R69	82000Ω	1	30823230	BTS-8200	
R70	82000Ω	1	30823230	BTS-8200	
R71	100KΩ	1	30104230	BTS-100K	
R72	330KΩ	1	30334230	BTS-330K	
R73	100KΩ	1	30104230	BTS-100K	
R74	3.9Meg	1	30395330	BTS-3.9Meg	
R75	100KΩ	1	30104230	BTS-100K	
R76	2.2Meg	1	30225330	BTS-2.2Meg	
R77	22KΩ	1	30223330	BTS-22K	
R78	2200Ω	1	30222330	BTS-2200	
R79	4700Ω 5%	1			
R80	4700Ω 5%	1			
R81	330KΩ	1	30334230	BTS-330K	
R82	330KΩ	1	30334230	BTS-330K	
R83	820KΩ	1	30824230	BTS-820K	
R84	82KΩ	1	30823230	BTS-82K	
R85	330KΩ	1	30334230	BTS-330K	
R86	2200Ω	1	34922330	BTS-3900	
R87	68KΩ	1	30683230		
R88	82KΩ	1	30823330		
R89	150KΩ	1	30154230		
R90	6800Ω	1	30682230		
R91	47KΩ	1	30473240	BTA-47K	
R92	10Meg	1	31006230	BTS-10Meg	
R93	1Meg	1	31005330		
R94	10Ω	1	30101230		
R95	10Ω	1	30101230		
R96	2000Ω	1	31004473	PW4-2000	
R97	5600Ω	2	30562230	BTS-5600	
R98	470Ω	1			
R99	2.7Ω	1	30000990	BWJ-2.7	
R100	470Ω	2	30471230	BTS-470	Note 4
R101A (R)		2	451000486		
B (R)	13Ω				
R102	7.5Ω	8	31000472		
R103	220KΩ	1	30224240	BTA-220K	

Note 1. Some versions use a 330Ω ½W resistor in this application.
Note 2. Some versions use a 82000Ω ½W resistor in this application.
Note 3. Some versions use a 18KΩ ½W resistor in this application.
Note 4. Not used in Chassis 181.
∗ Items R101A, R101B are combined in one unit.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: CBS-Columbia PART No.	Hallodorson PART No.	Merit PART No.	RCA TYPE No.	Rem PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
T1	Horiz. Output Trans.	12001091	TB47			AY-01 ①			
T2	Vert. Output Trans.	10000811	21900 ② ③	A-2S24 ② ③		V313 ④	A-S133 ③	26852 ③	A-109X ③
T3A	Yoke Horiz. (34MH)	16001481 ⑤	DF608 ②	MDF-75 ②	2220H ③	BT70T25 ③	DY-18A ③	Y-10 ③ ④	Y-18-1 ③
B	Vert. (40MH)								

① Available by special order only.
② Use 15 to 1 turns ratio.
③ Connect as sub transformer.
④ Drill new mounting hole(s).
⑤ Cut and tape yellow lead.
⑥ Includes capacitor C49; resistors R79, R80, R96.
⑦ Use original rear cover and centering device.
⑧ Connect horizontal yoke damping network across terminals #3 and #7. Use original if necessary.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	CBS-Columbia PART No.	REPLACEMENT DATA: Hallodorson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.	NOTES
T4	2.2KΩ	3-4Ω	Part of Speaker 73000801		A3928	A3876		S-1X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP	CBS-Columbia PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	8"	PM	3-4Ω	73000800 ①	8A07	20562	① Used in Models ST603, ST615, ST616, ST621, ST622, UST602, UST615, UST616, UST621, UST622.
	5"	PM		73000742 ②	5A07	20502	
	5"	PM		73000741 ③	5A07	20502	② Used in Models ST623, ST624, UST623.
	6"	PM		73000781 ④	6A1	23981	
	6"	PM		73000781 ⑤	6A1	23981	③ Used in Models ST634.
	6"x 9"	PM		73000821 ⑥	69A3	23981	④ Used in Models SC633, SC634, USC632, USC634.
	6"x 9"	PM		73000821 ⑦	69A3	23981	⑤ Used in Models SC627, USC627, USC628.
	6"x 9"	PM		73000771 ⑧	69A3	23981	⑥ Used in Models SC635, SC636, USC635, USC636.
	8"	PM		73000351 ⑨	8A4	20982	⑦ Used in Models SC631, SC633, USC631, USC632.

COILS (RF-IF)

ITEM No.	USE	DC RES: PRI.	SEC.	REPLACEMENT DATA: CBS-Columbia PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω					
L2	Ant. Matching Trans.	0Ω	0Ω					
L3	FM Trap	0Ω						
L4	IF Trap	.2Ω						
L5	Ant., RF, Mixer Grid, Osc. Coils	0Ω						
L6	Neut. Coil	0Ω						
L7	RF Coil	0Ω						
L8	RF Coil	0Ω						
L9	Conv. Plate	.1Ω	0Ω					
L10	1st Video IF	0Ω	.1Ω	13001171	17-5001	TV-125	6231	
L11	Fil. Choke	0Ω		15000851	19-1001		6804	1.5 Microhenries Included 41.25MC Trap
L12	2nd Video IF		.1Ω	13001111				1.5 Microhenries
L13	Fil. Choke	0Ω		15000851	19-1001		6804	
L14	3rd Video IF	.1Ω	.1Ω	13001031				
L15A	4th Video IF	.1Ω	.1Ω	13001041				
B	2nd Sound IF	1Ω						
L16	1st Sound IF	.7Ω		15000871				
L17	Series Peaking Coil	1.6Ω		16001461	19-3005		4623	2.7 Microhenries-Not used in some versions
L18	Series Peaking Coil	11Ω		16001364	19-3280	TV-125	6181	136 Microhenries-Note 1
L19	Shunt Peaking Coil	7Ω		16000045	19-3500		6174	500 Microhenries
L20	Series Peaking Coil	3.3Ω		15000701	19-1005		4623	10 Microhenries, IRC Part No. CL-1
L21	4.5MC Trap	2.9Ω		16001401	30-1004	TV-121	1469	
L22	Series Peaking Coil	11Ω		16001364	19-3280	TV-125	6181	136Microhenries-Note 1
L23	Shunt Peaking Coil	16Ω		16000045	19-3500		6174	530 Microhenries
L24	3rd Sound IF	3.3Ω	2.9Ω	13001151	17-3498	TV-123	6303	
L25	Quadrature Coil	3.3Ω		15000731			1481	
L26	RF Choke	1.5Ω		15000702	19-1001		4804	1.8 Microhenries; IRC Part No. CLA-Not used in some versions. versions.

Note 1. Alternate Part No. 16001362.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES: SEC.	PRI.	CBS-Columbia PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Rem PART No.	Thordorson PART No.	NOTES
L27	22Ω	55Ω	15000741	20-1402	TV-162	6183	20582		RS-3	Tertiary Windings 43Ω

FILTER CHOKE

ITEM No.	RATINGS: TOTAL CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT	REPLACEMENT DATA: CBS-Columbia PART No.	Halloderson PART No.	Merit PART No.	Stancor PART No.	Thordorson PART No.	Triad PART No.
L28	300A	60Ω	1000 ∗ MHY	Part of Speaker 73000801	CB040	CB084	CS247	26C41	C-33X

SELENIUM RECTIFIER

ITEM No.	RATING: CURRENT	REPLACEMENT DATA: CBS-Columbia PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	NOTES
M1	.200A	82000061	1236A	MR300	66300	624	300	
M2	.200A	82000061	1236A	MR300	66300	624	300	

CBS-COLUMBIA MODELS UST6327, UST6328, UST6331, UST6332, UST6334, UST6335, UST6336, UST6337, UST6338, UST6341, UST6342, UST6343, UST6344, UST6345, UST6346, UST6347, UST6348, UST6349, UST6350, UST6351, UST6352, UST6353, UST6354, UST6355, UST6356, UST6357, UST6358, UST6359, UST6360, UST6361, UST6362, UST6363, UST6364, UST6365, UST6366, UST6367, UST6368, UST6369, UST6370, UST6371, UST6372, UST6373, UST6374, UST6375, UST6376, UST6377, UST6378, UST6379, UST6380, UST6381, UST6382, UST6383, UST6384, UST6385, UST6386, UST6387, UST6388, UST6389, UST6390, UST6391, UST6392, UST6393, UST6394, UST6395, UST6396, UST6397, UST6398, UST6399, UST6400, UST6401, UST6402, UST6403, UST6404, UST6405, UST6406, UST6407, UST6408, UST6409, UST6410, UST6411, UST6412, UST6413, UST6414, UST6415, UST6416, UST6417, UST6418, UST6419, UST6420, UST6421, UST6422, UST6423, UST6424, UST6425, UST6426, UST6427, UST6428, UST6429, UST6430, UST6431, UST6432, UST6433, UST6434, UST6435, UST6436, UST6437, UST6438, UST6439, UST6440, UST6441, UST6442, UST6443, UST6444, UST6445, UST6446, UST6447, UST6448, UST6449, UST6450, UST6451, UST6452, UST6453, UST6454, UST6455, UST6456, UST6457, UST6458, UST6459, UST6460, UST6461, UST6462, UST6463, UST6464, UST6465, UST6466, UST6467, UST6468, UST6469, UST6470, UST6471, UST6472, UST6473, UST6474, UST6475, UST6476, UST6477, UST6478, UST6479, UST6480, UST6481, UST6482, UST6483, UST6484, UST6485, UST6486, UST6487, UST6488, UST6489, UST6490, UST6491, UST6492, UST6493, UST6494, UST6495, UST6496, UST6497, UST6498, UST6499, UST6500, UST6501, UST6502, UST6503, UST6504, UST6505, UST6506, UST6507, UST6508, UST6509, UST6510, UST6511, UST6512, UST6513, UST6514, UST6515, UST6516, UST6517, UST6518, UST6519, UST6520, UST6521, UST6522, UST6523, UST6524, UST6525, UST6526, UST6527, UST6528, UST6529, UST6530, UST6531, UST6532, UST6533, UST6534, UST6535, UST6536, UST6537, UST6538, UST6539, UST6540, UST6541, UST6542, UST6543, UST6544, UST6545, UST6546, UST6547, UST6548, UST6549, UST6550, UST6551, UST6552, UST6553, UST6554, UST6555, UST6556, UST6557, UST6558, UST6559, UST6560, UST6561, UST6562, UST6563, UST6564, UST6565, UST6566, UST6567, UST6568, UST6569, UST6570, UST6571, UST6572, UST6573, UST6574, UST6575, UST6576, UST6577, UST6578, UST6579, UST6580, UST6581, UST6582, UST6583, UST6584, UST6585, UST6586, UST6587, UST6588, UST6589, UST6590, UST6591, UST6592, UST6593, UST6594, UST6595, UST6596, UST6597, UST6598, UST6599, UST6600, UST6601, UST6602, UST6603, UST6604, UST6605, UST6606, UST6607, UST6608, UST6609, UST6610, UST6611)

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			CBS-Columbia PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M3	3AG P/T S/B	1 1/4A 125V	43000070		3151.25 (3AG P/T S/B 1 1/4A)		MDV 1 1/4	

CRYSTAL DIODES

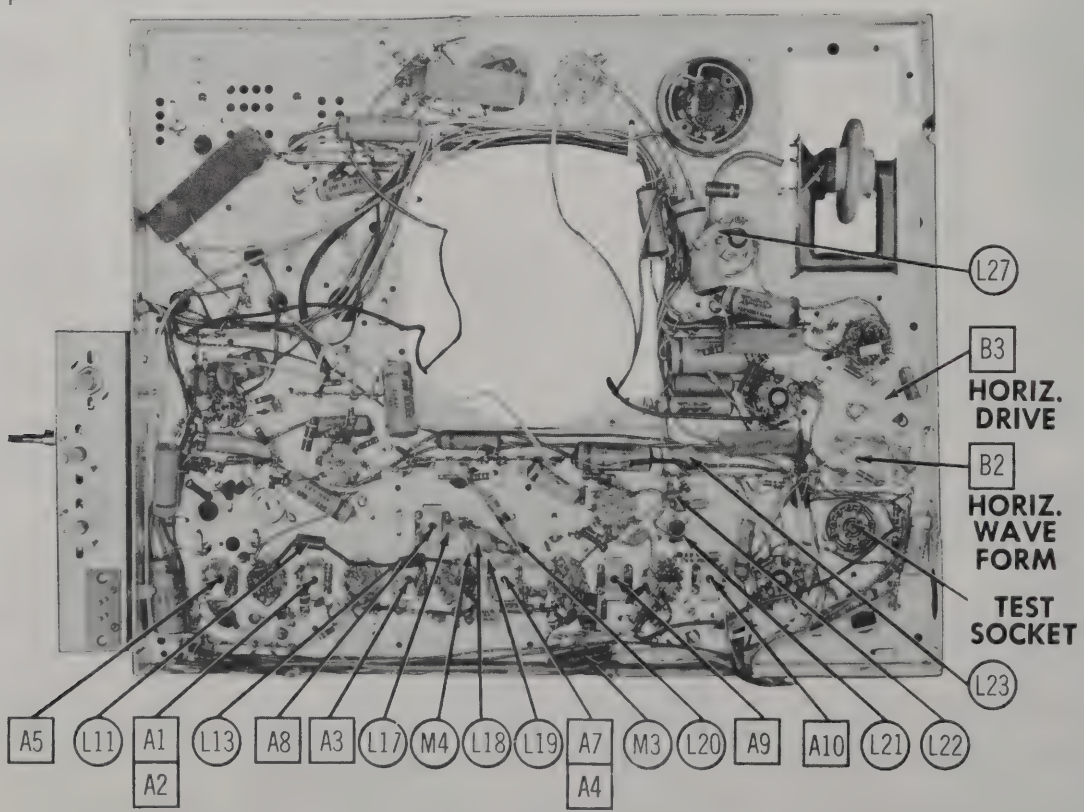
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		CBS-Columbia PART No.	SYLVANIA PART No.	
M4	1N60 *	63000091	1N60	Video Det. (Pigtail)

* Some versions may use crystal diode type 1N64 in this application.

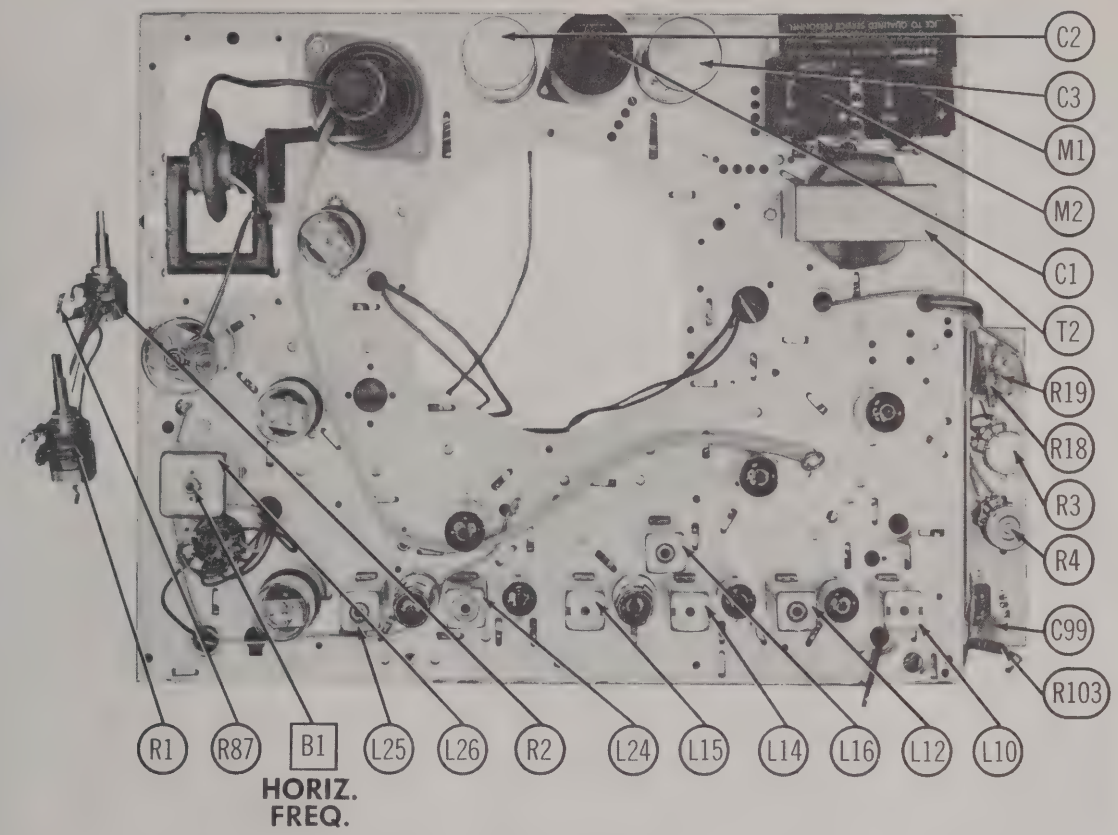
MISCELLANEOUS

ITEM No.	PART NAME	CBS-Columbia PART No.	NOTES
M5	Dial Light	64000011	#47-Not used in some versions
M6	Tuner	69000721	VHF-Chassis 1611-Not used in some versions
	Tuner	69000711	VHF-Chassis 1611-Not used in some versions
	Tuner	69000692	VHF-Chassis 1610
M7	Tuner	69000701	UHF-Chassis 1610
M8	Switch	40000361	Local-Normal-Distant (SP, 3 Position-Rotary, Wafer Type)
M9	Centering Device		Part of Deflection Yoke (T3) Rear Cover
M10	Ion Trap	19000081	
M11	Magnet	19000241	Anti-Barkhausen-Chassis 1610 only.
B3	Trimmer Cap.	25000061	Horiz. Drive (25-250MMF)
	Safety Glass	77000358	Models 3T602, U3T602 only.
	Safety Glass	77000433	All Models except 3T602, U3T602

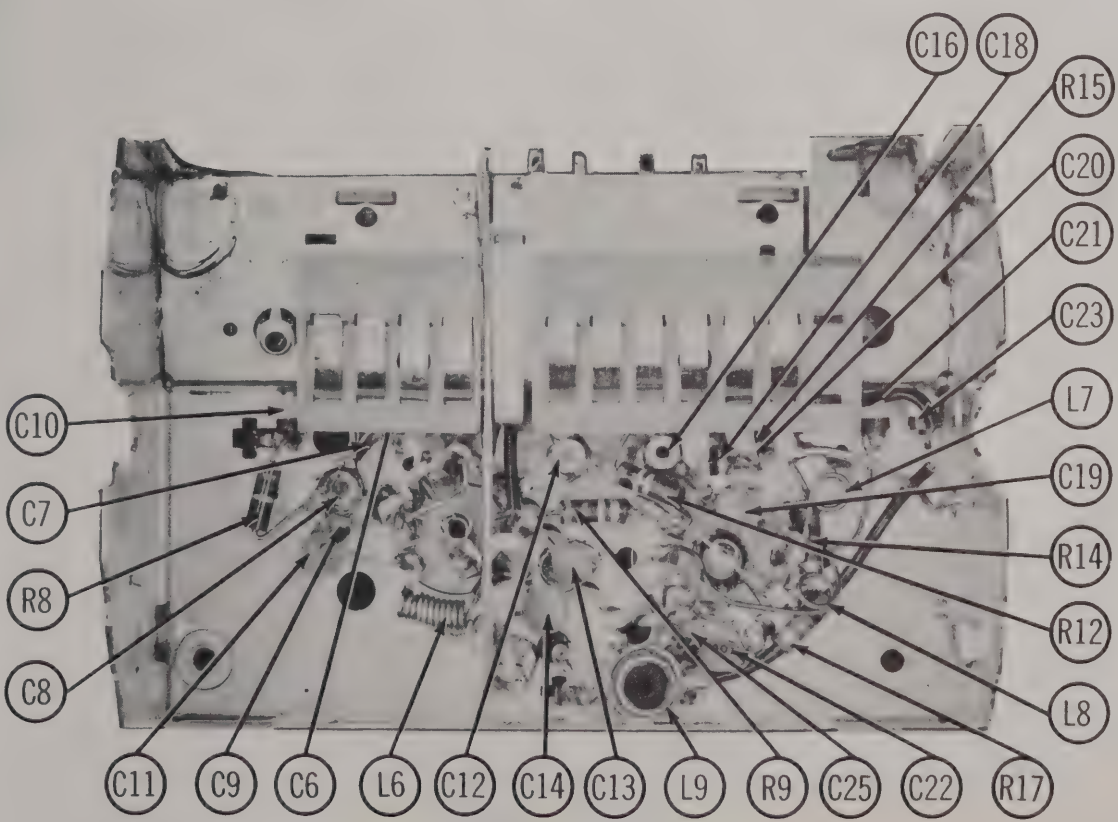
TP1	pin 1	-29V	V13 (HORIZ DRIVE)	TP6	pin 7	130V	GRID BIAS (V9)
TP2	pin 2	117V AC	LINE VOLTAGE	TP7	pin 8	-1.1V	VIDEO DET. OUTPUT
TP3	pin 4	117V AC	LINE VOLTAGE	TP8	pin 9	265V	B SUPPLY
TP4	pin 5	-.9V	IF AGC	TP9	pin 11	255V	B SUPPLY
TP5	pin 6	245V	B (PLATE) (V9)				



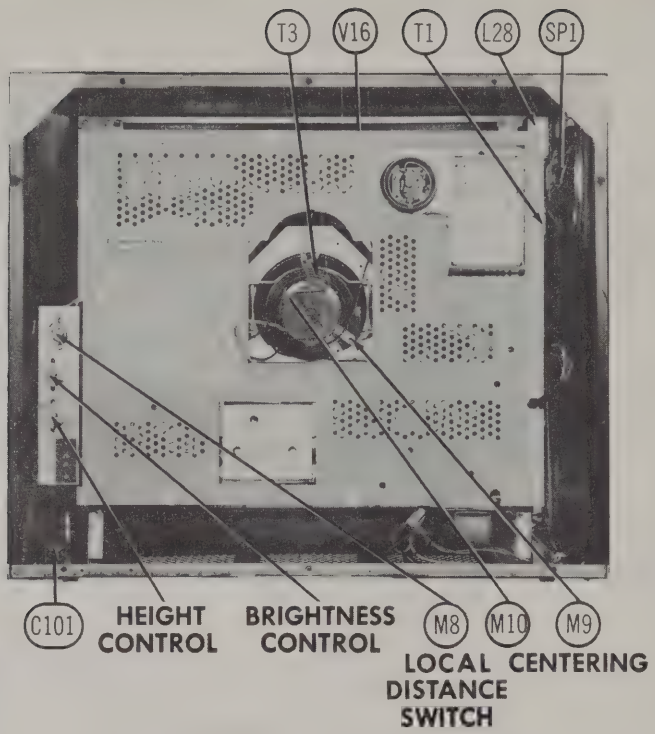
CHASSIS BOTTOM VIEW INDUCTOR & ALIGN. IDENTIFICATION



CHASSIS TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn the set on and tune in a TV station. Adjust the controls for a normal picture. Set the horizontal hold control to the center of its range.

2. Short terminals "C" and "D" of the horizontal oscillator coil (L27) and adjust the horizontal frequency slug (B1) until the picture is in sync. Set the slug at the center of its range in which the picture remains in sync.

3. Remove the short and connect the vertical amplifier of an oscilloscope thru a 10MMF capacitor to terminal "C" of (L27). Low side to chassis.

4. Adjust the horizontal waveform slug (B2) waveform shown in Fig. 3. The sound peak and the sharp peak must be of equal amplitude.

5. Adjust B1 so that the picture just begins to fall out of sync with the horizontal hold control fully clockwise.

6. Using an insulated screw driver, turn the horizontal drive control (B3) counter clockwise until a bright vertical line appears in the picture, then turn B3 clockwise until the line just disappears.

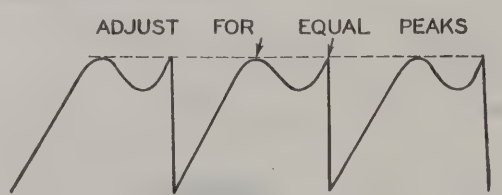
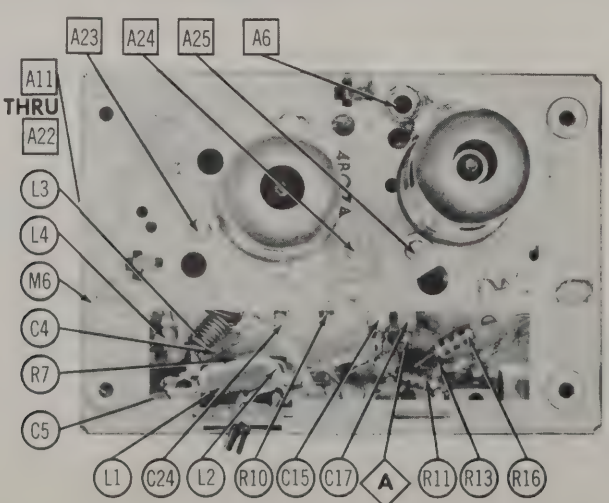


FIG. 3



RF TUNER TOP VIEW

PHOTOFACT* Folder

*TRADE MARK

CROSLEY MODELS J-21LPKBF, LPKBU, LPKMF, LPKMU (Ch. 476, 477)

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CROSLEY MODEL J-21LPKBF

TRADE NAME	Crosley Models J-21LPKBF, J-21LPKMF (Ch. 476), J-21LPKBU, J-21LPKMU (Ch. 477)
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	Television Receiver
TUBES	Seventeen
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.32 Amp. @ 117 Volts AC
TUNING RANGE—	Channels 2 thru 13 VHF, 14 thru 82 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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CROSLEY MODELS J-21LPKBF, LPKBU, LPKMF, LPKMU (Ch. 476, 477)

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 9 push on type control knobs from side panel of cabinet.
2. Remove 2 knobs from antenna on top of cabinet.
3. Remove 7 wood screws. Remove rear cover.
4. Remove 1 wood screw holding antenna terminal bracket.
5. Remove 2 wood screws holding AC interlock bracket.
6. Disconnect speaker leads, picture tube socket, H. V. lead, phono motor plug and phono input jack.
7. Remove ion trap, centering magnet, and chain drive. from tuner.
8. Remove 2 bolts from two brackets at the upper part of the chassis.
9. Remove 4 chassis bolts. Remove chassis.
10. Remove 4 speaker nuts. Remove speaker.

MODELS	CHASSIS
J-21LPKBF, J-21LPKMF	476
J-21LPKBU, J-21LPKMU	477

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 3 wood screws holding metal strip at the bottom edge of the safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

SPECIAL ADJUSTMENTS

A. AGC Level Control Adjustments

Turn the set on and tune in a medium to strong TV signal. Set contrast control full clockwise so that area switch is in "Fringe" position. Set noise gate control fully counter clockwise.
Rotate the AGC level control fully counter clockwise and note position of slot in shaft. Rotate the AGC level control slowly clockwise to where the picture shows the first sign of overload and note the position of the slot in the shaft. Back the control off approximately 45 to 50% of this distance. Recheck all the stations available for sufficient contrast and no signs of overload. Reset the noise gate control if necessary.

B. Noise Gate Control Adjustment

Turn the set on and tune in a TV station. Turn the noise gate control (R10) fully counter clockwise. Then advance the control only far enough to stabilize the picture. The final adjustment of this control should be made on the strongest signal available.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Set horizontal hold control to the center range. Adjust the horizontal frequency slug (L31) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, it is necessary to remove the rear cover and supply power to the set. Adjustment is located on tube side of chassis. Adjust the buzz control (R11) for maximum volume and minimum buzz.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

CROSLEY MODELS J-21LPKBF, LPKBU, LPKMF, LPKMU (Ch. 476, 477)

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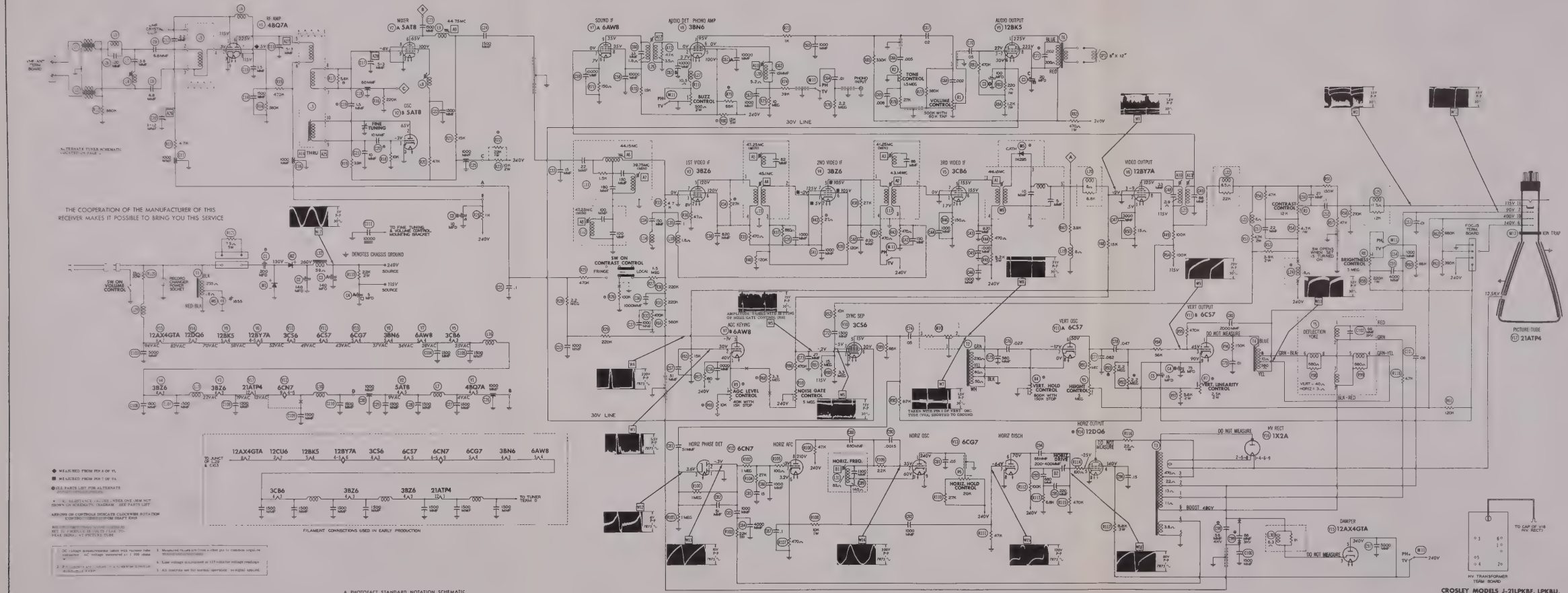
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
12AX4GTA 12DQ6 12BK5 12BY7A 3C56 6C57 6CG7 3BN6 6AW8 3BZ6
3BZ6 3BZ6 21ATP4 6CN7 5AT8 4BQ7A
12AX4GTA 12CU6 12BK5 12BY7A 3C56 6C57 6CN7 6CG7 3BN6 6AW8
3CB6 3BZ6 3BZ6 21ATP4
FILAMENT CONNECTIONS USED IN EARLY PRODUCTION
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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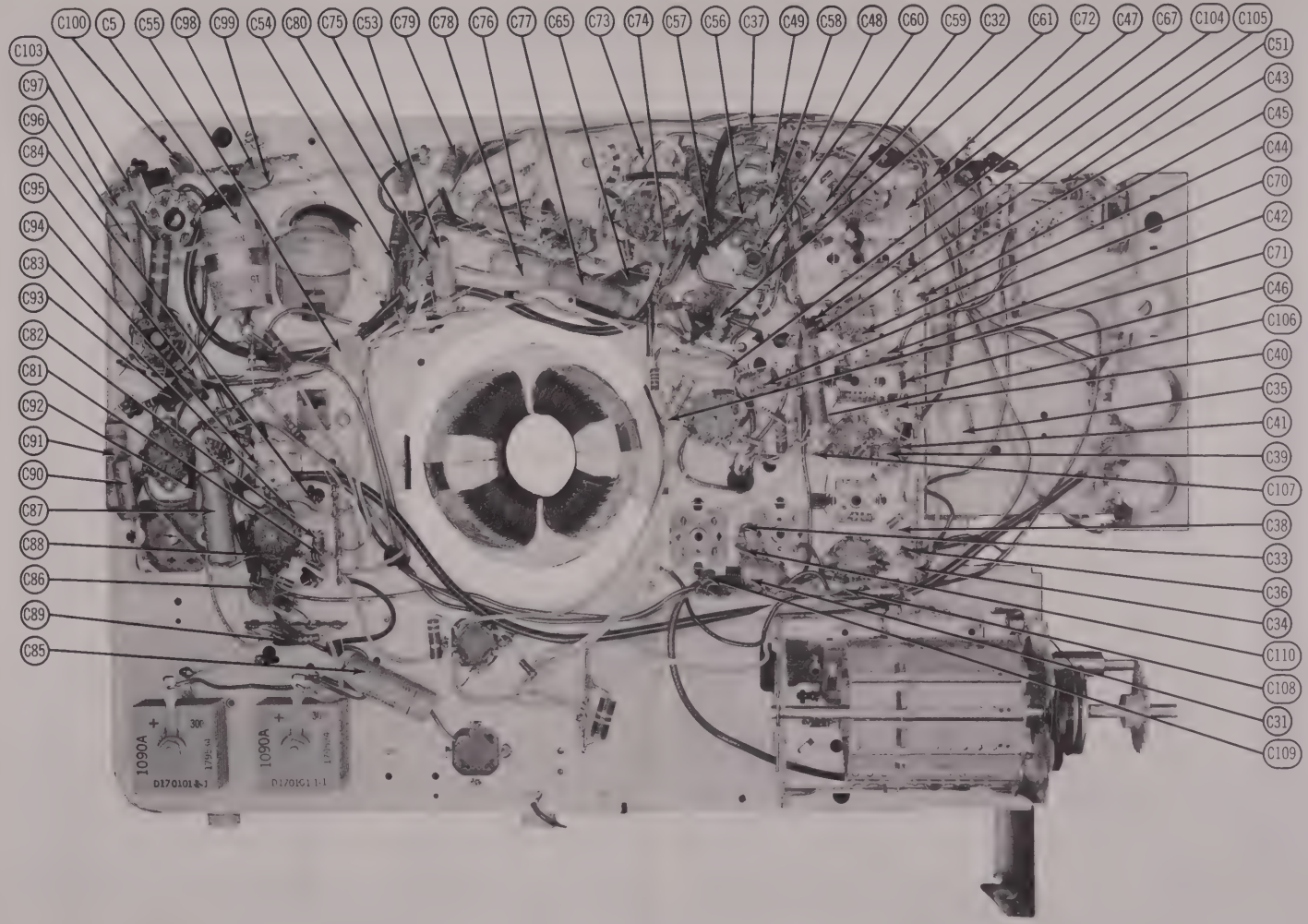
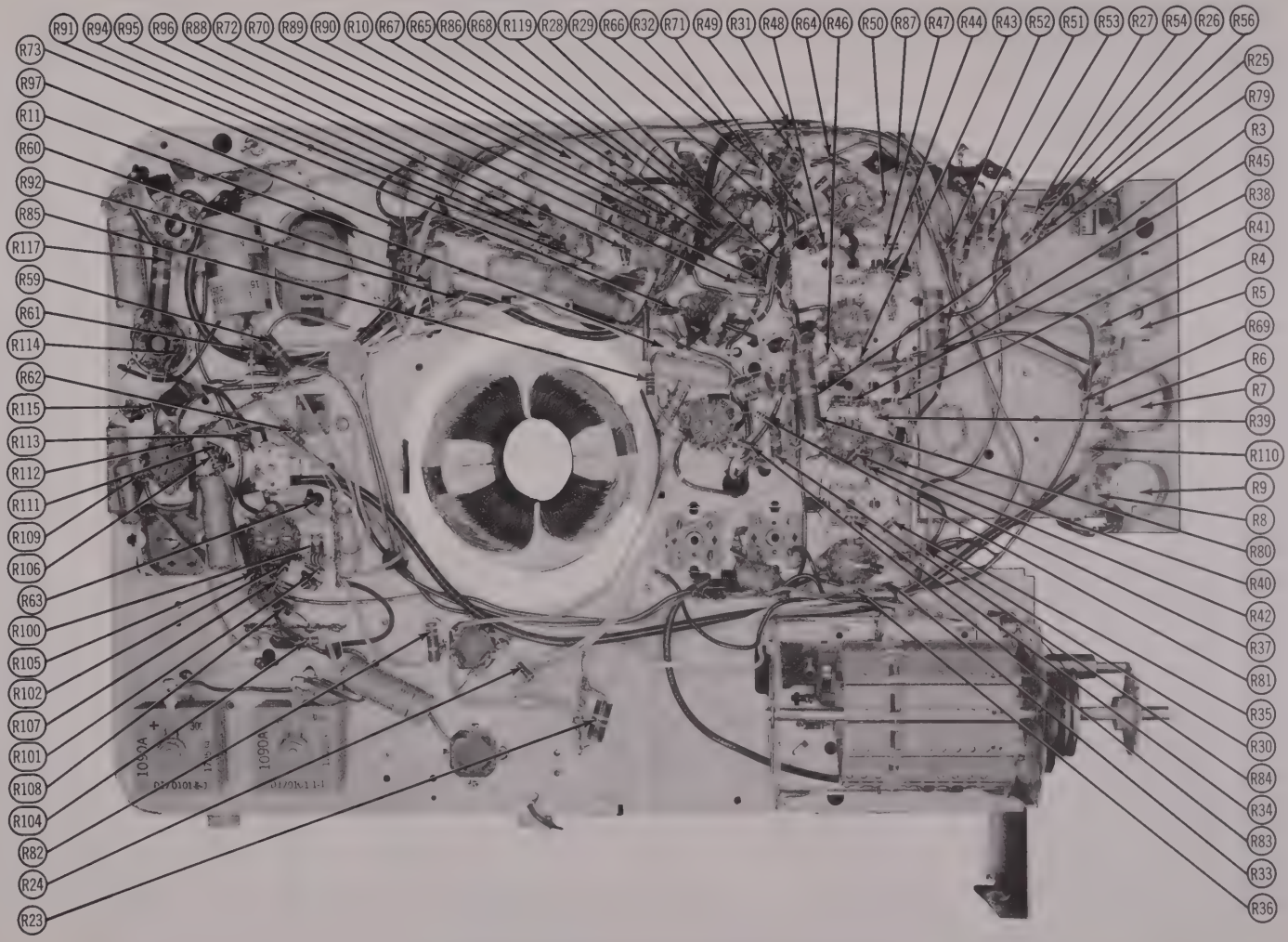
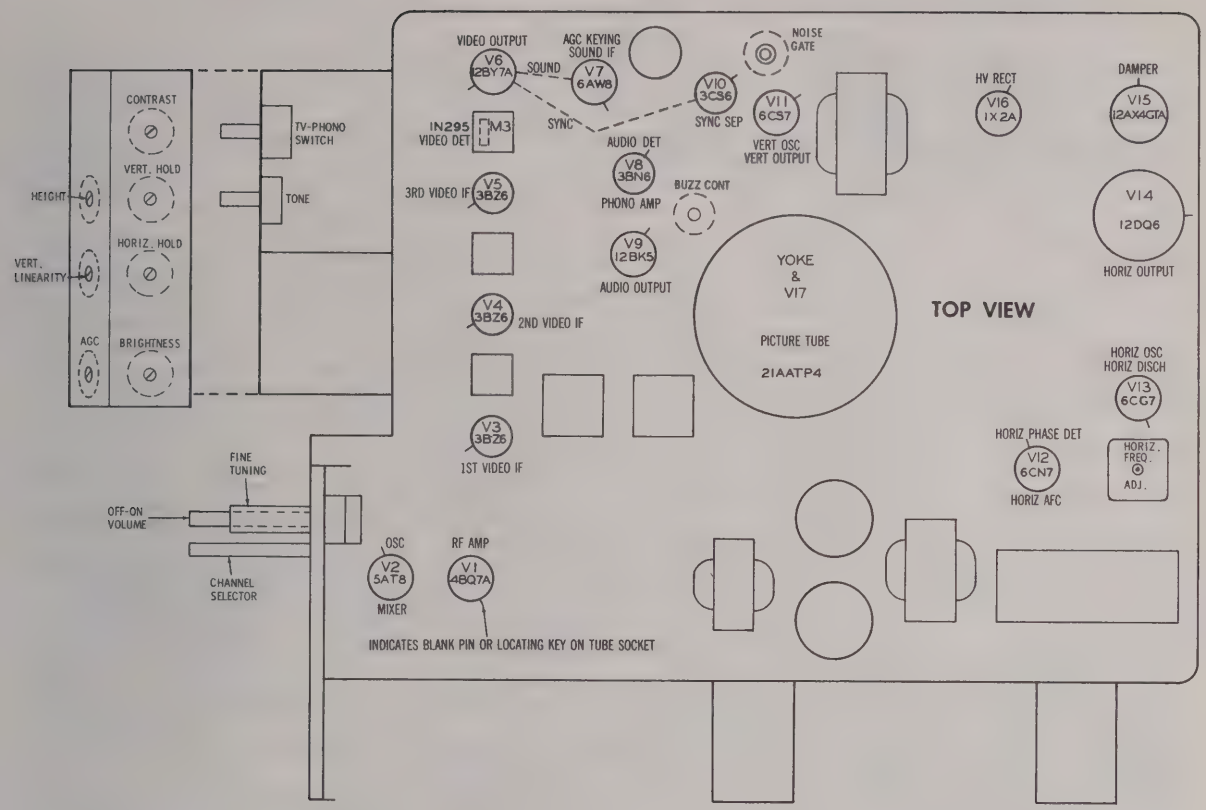


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS-BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

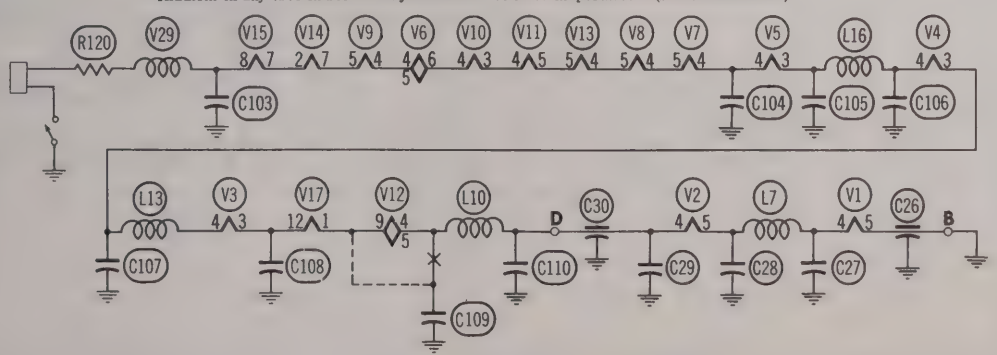
POWER SUPPLY FAILURE
No raster, no sound -**Selenium Rectifiers (M1 & M2)**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V2, V3, V4, V5, V6, V9**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V7, V17**
Has pic, no sound - **V7, V8, V9**
Overloaded picture - **V7**

SYNC FAILURE
No vert. sync - **V10, V11**
No horiz. sync - **V10, V12, V13**
No vert. or horiz. sync - **V10**

SWEEP FAILURE
No raster, has sound - **V13, V14, V15, V16, V17**
No vertical deflection - **V11**
Poor vert. linearity or foldover - **V11**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, V16, M1, M2**
Vert. off freq. - **V10, V11**
Horiz. off freq. - **V10, V12, V13**

NOTE: Since this receiver employs tubes used in a series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See circuit below).



SET 317 FOLDER 4

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an Isolated transformer to protect the equipment. The high voltage lead should be securely taped away from the chassis. Do not remove the horizontal oscillator tube (V13) to disable the high voltage.

VIDEO IF ALIGNMENT

Turn the contrast control to the minimum position. Connect the negative lead of a 3 volt bias battery to the ungrounded side of C31 and C32. Connect the positive lead to chassis. Attenuate generator output to maintain not more than two volts on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.01MFD	High side to point Ⓑ. Low side to chassis.	44.15MC	Any non-interfering channel	DC probe to point Ⓐ. Common to chassis.	A1	Adjust for maximum deflection.
2.	"	"	43.14MC	"	"	A2	Adjust for maximum deflection. If two peaks occur, use peak nearest clip end of coil.
3.	"	"	41.25MC	"	"	A3	Adjust for MINIMUM deflection. The correct null point should occur when the core is nearest the end of the coil opposite the clip end. Repeat steps 2 and 3.
4.	"	"	45.1MC	"	"	A4	Adjust for maximum deflection. Use peak nearest clip end of coil.
5.	"	"	47.25MC	"	"	A5	Adjust for MINIMUM deflection. Use null point farthest from clip end of coil. Repeat steps 4 and 5.
6.	"	"	44.15MC	"	"	A6	Adjust for maximum deflection. Use peak nearest clip end of coil.
7.	"	"	39.75MC	"	"	A7	Adjust for MINIMUM deflection. Use null point farthest from clip end of coil. Repeat steps 6 and 7.
8.	"	"	47.25MC	"	"	A8	Adjust for MINIMUM deflection. Use null point farthest from clip end of coil.
9.	"	High side to point Ⓒ. Low side to chassis.	44.75MC	"	"	A9	Connect a 100Ω resistor in series with a .001MFD from pin 1 (grid) of 3BZ6 (V3) to chassis. Adjust A9 for maximum deflection. Remove 100Ω resistor and .001MFD capacitor from pin 1 of V3 to chassis.

OVERALL VIDEO IF RESPONSE CHECK

Leave bias connected as under "Video IF Alignment".
Use only enough sweep and marker generator output to provide usable pattern on scope.
If necessary to disable the local oscillator tube to reduce the possibility of erroneous indications, remove the converter tube from its socket and replace with a 5AT8 which has pin 2 removed.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Direct	High side to floating tube shield over dummy converter tube. Low side to chassis.	44MC (10MC Swp.)	39.75MC 41.25MC 42.75MC 45.75MC 47.25MC	Any	Vert. Amp. to point Ⓐ. Low side to chassis.		Check for response similar to Fig. 1. If necessary, SLIGHTLY retouch A1, A2, A4, A6, and A9. Adjust A3 so that 41.25MC marker falls in trap notch. If markers are off a great deal, repeat "Video IF Alignment". Replace original 5AT8 in its socket.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
11.	Direct	High side to point Ⓐ. Low side to chassis.	Not used	4.5MC (400∿ Mod.)	Any	Vert. Amp. thru detector (Fig. 2) to pin 11 (cathode) of picture tube. Low side to chassis.	A10	Adjust for MINIMUM 400∿ indication on scope.

SOUND IF ALIGNMENT USING ON THE AIR SIGNAL

Turn the set on and tune in a strong TV signal. Turn the Buzz control (R11) 90° from maximum clockwise rotation. Adjust A11 for maximum volume. Reduce the signal strength into the receiver by inserting an attenuator in series with the antenna and the receiver antenna terminals. If a suitable attenuator is not available, remove the antenna from the antenna terminals and stray feed the signal into the receiver by placing the antenna near the antenna terminals. Adjust A12 and A13 for maximum volume. Adjust R11 for minimum noise. Reconnect antenna and readjust A11 for maximum volume. If necessary, reduce volume so that this peak can be heard.

ALTERNATE SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Set volume control at a low level.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
12.	Direct	High side to point Ⓐ. Low side to chassis.	4.5MC (7.5KC Swp.)	4.5MC (400∿ FM Mod.)	Any non-interfering channel	Across secondary of audio output trans. (T6).	A11	Set buzz control (R11) 90° from maximum clockwise rotation. Adjust A11 for maximum 400∿ indication on scope.
13.	"	"	"	"	"	"	A12, A13	Attenuate signal generator so that signal level is below the limiting level of the 3BN6 as evidenced by background hiss and noise. Adjust A12 and A13 for maximum response on scope.
14.	"	"	Not used	4.5MC (400∿ AM Mod.)	"	"	R11	Use high signal generator output and adjust R11 for MINIMUM 400∿ indication on scope.
15.	"	"	4.5MC (7.5KC Swp.)	4.5KC (400∿ FM Mod.)	"	"	A11	With volume control at low level, retouch A11 for maximum 400∿ indication on scope.

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Leave bias connected as under "Video IF Alignment".
Remove the dummy tube and replace the original 5AT8 in its socket. The channel oscillator adjustment screws are reached through a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible through this hole as channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
16.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp.)	55. 25MC 59. 75MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A14	Adjust to place sound marker in trap notch as in Fig. 3. Video marker should fall at 40%.
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3		A15	
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4		A16	
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5		A17	
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6		A18	
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7		A19	
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8		A20	
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9		A21	
			195MC (10MC Swp.)	193. 25MC 197. 75MC	10		A22	
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11		A23	
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12		A24	
			213MC (10MC Swp.)	211. 25MC 215. 75MC	13		A25	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2. 5 volt bias supply to the ungrounded side of C31. Connect positive lead to chassis. Connect the negative lead of a 3 volt bias supply to the ungrounded side of C32. Connect positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp.)	193. 25MC 197. 75MC	10	Vert. Amp. thru 10KΩ to point (C). Low side to chassis.	A26, A27, A28	Adjust for response curve similar to Fig. 4 with markers above 90%.
18.	"	"	213MC (10MC Swp.)	211. 25MC 215. 75MC	13	"		If markers fall below 70% on any channel, make compromise adjustments of A26, A27, and A28 with channel switch set to that channel. Recheck all other channels to see that they have not been seriously affected.
			207MC (10MC Swp.)	205. 25MC 209. 75MC	12			
			201MC (10MC Swp.)	199. 25MC 203. 75MC	11			
			189MC (10MC Swp.)	187. 25MC 191. 75MC	9			
			183MC (10MC Swp.)	181. 25MC 185. 75MC	8			
			177MC (10MC Swp.)	175. 25MC 179. 75MC	7			
			85MC (10MC Swp.)	83. 25MC 87. 75MC	6			
			79MC (10MC Swp.)	77. 25MC 81. 75MC	5			
			69MC (10MC Swp.)	67. 25MC 71. 75MC	4			
			63MC (10MC Swp.)	61. 25MC 65. 75MC	3			
			57MC (10MC Swp.)	55. 25MC 59. 75MC	2			

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.

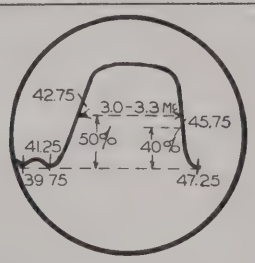


FIG. 1

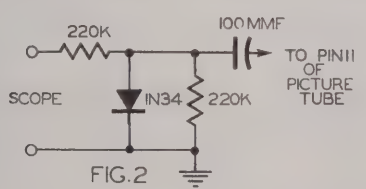


FIG. 2

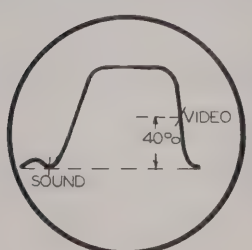


FIG. 3

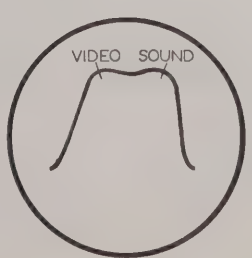
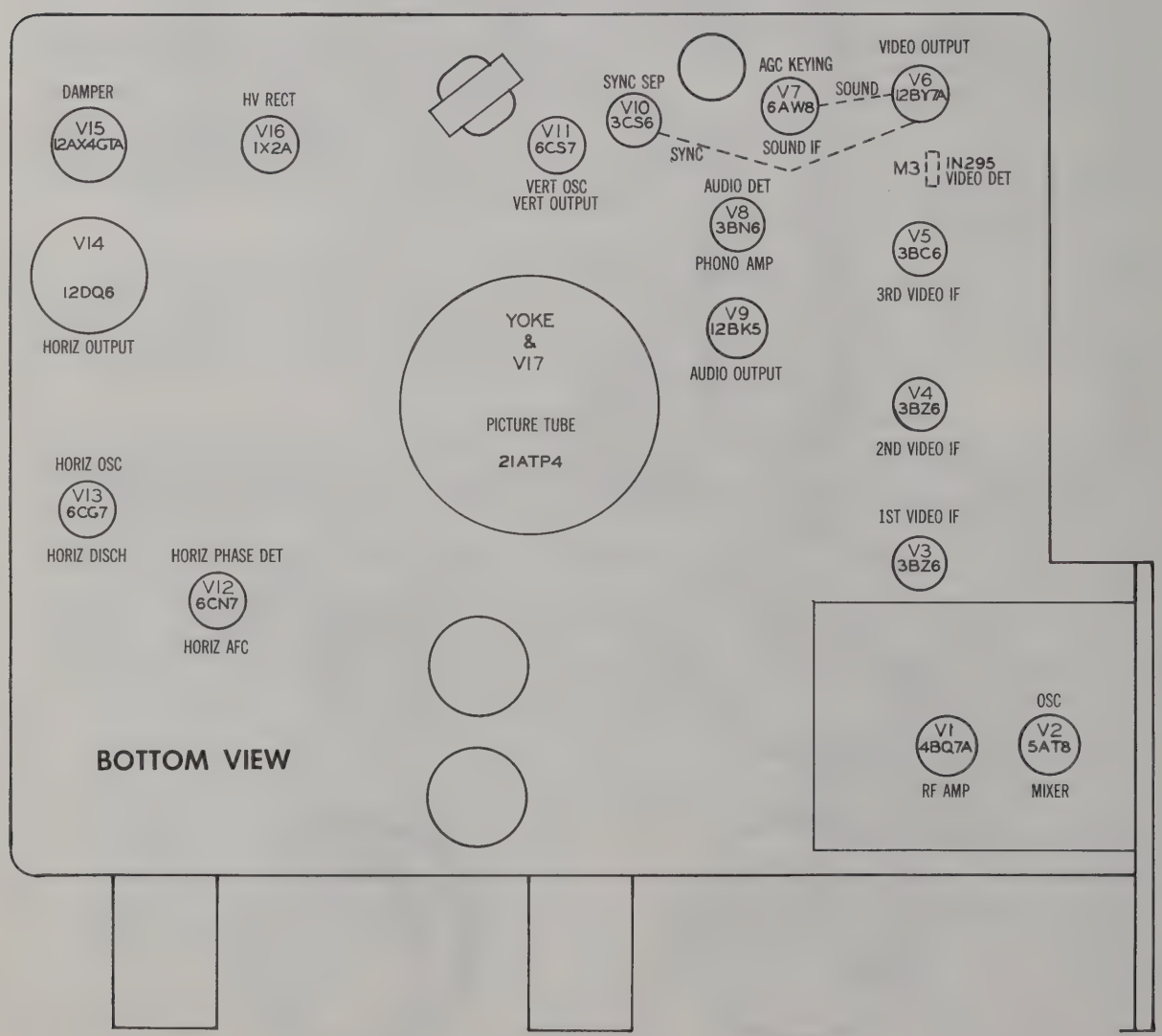


FIG. 4

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	4BQ7A	INF	3. 5Meg	0Ω	1Ω	0Ω	† 1KΩ	250KΩ	INF	0Ω
V 2	5AT8	10KΩ	† 14KΩ	0Ω	2Ω	1Ω	† 25KΩ	† 60KΩ	0Ω	220KΩ
V 3	3BZ6	550KΩ	47Ω	4Ω	5Ω	▲ 470Ω	▲ 470Ω	0Ω		
V 4	3BZ6	60KΩ	▲ 27Ω	5Ω	6Ω	† 500Ω	† 500Ω	60KΩ		
V 5	3CB6	470Ω	150Ω	6Ω	7Ω	† 8. 7KΩ	† 8. 7KΩ	0Ω		
V 6	12BY7A	15Ω	3. 9KΩ	0Ω	14Ω	14Ω	13Ω	† 4. 8KΩ	† 20KΩ	0Ω
V 7	6AW8	30KΩ	15KΩ	800KΩ	7Ω	8Ω	150Ω	. 9Ω	† 25KΩ	† 25KΩ
V 8	3BN6	300Ω	3. 5Ω	8Ω	9Ω	† 12KΩ	39KΩ	† 330KΩ		
V 9	12BK5	† 800Ω	NC	470KΩ	14Ω	17Ω	1. 4KΩ	470KΩ	† 500Ω	NC
V 10	3CS6	20KΩ	0Ω	12Ω	13Ω	35KΩ	1. 4KΩ	2. 5Meg		
V 11	6CS7	▰ 1. 1KΩ	NC	2Meg	12Ω	10Ω	▰ 2Meg	350KΩ	60Ω	6. 5KΩ
V 12	6CN7	0Ω	2Meg	1Meg	2Ω	2Ω	470Ω	3Meg	† 47KΩ	3Ω
V 13	6CG7	† 300Ω	32KΩ	10KΩ	9Ω	10Ω	† 100KΩ	47KΩ	0Ω	0Ω
V 14	12DQ6	TP	19Ω	NC	† 6. 8KΩ	470KΩ	TP	17Ω	0Ω	TOP CAP ▰ 50Ω
V 15	12AX4GTA	TP	NC	250KΩ	NC	† 59Ω	NC	19Ω	22Ω	
V 16	1X2A		PINS	1 - 9	HAVE	INF	RESISTANCE			TOP CAP ▰ 520Ω
V 17	21ATP4	3Ω	▰ 200KΩ	PIN 6 ▰ 350KΩ	PIN 10 ▰ 120KΩ	PIN 11 † 50KΩ	PIN 12 4Ω			

† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 7 OF V4.
▰ MEASURED FROM PIN 3 OF V15.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	4BQ7A	4BQ7A	
V2	Mixer-Oscillator	5AT8	5AT8	
V3	1st. Video IF Amplifier	3BZ6	3BZ6	
V4	2nd. Video IF Amplifier	3BZ6	3BZ6	
V5	3rd. Video IF Amplifier	3CB6	3CB6	
V6	Video Output	12BY7A	12BY7A	
V7	AGC Keying-Sound IF	6AW8	6AW8	
V8	Audio Det.-Phono Amp.	3BN6	3BN6	
V9	Audio Output	12BK5	12BK5	
V10	Sync Separator	3CS6	3CS6	
V11	Vert. Osc.-Vert. Output	6CS7	6CS7	
V12	Horiz. Phase Det.-Horiz. AFC	6CN7	6CN7	
V13	Horiz. Osc.-Horiz. Discharge	6CG7	6CG7	
V14	Horiz. Output	12DQ6	12DQ6	12CU6 used in early production
V15	Damper	12AX4GTA	12AX4GTA	
V16	HV Rectifier	1X2A	1X2A	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: CBS PART No.	REPLACEMENT DATA: GENERAL ELECTRIC PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
V17	21ATP4 ①	21ATP4 ①	21ATP4 ①	21ATP4 ② 21ATP4A ②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	200	200	158557-1 (Note 1)	E59B294	EZ10408	WS342		D-100	R1646
C2	140	350	159902-1	AFHS1-73	B034	FP229.3	TM-D80-350	D-175	R2165
C3A	▲140	350	159900-1	E4D980		FP420.28	TM-4151	T-552	R2163
B	▲10	350					TD-80-350	FMD-3520	
C	■20	350							
D	100	50							R2164
C4A	■5	350	159901-1	E3B409	BR435	FP213	TM-80-150	S-085	
B	▲75	150			A023	TC60	TD-8-350	FM-3508	
C5	15	575	159319-1	PRS600V20	BRHV616	TC92	TD-10-600	MT-4530 *	R2197
								MT-4530	

Note 1. Some versions may use alternate part number 170084-1 in this application.
* Connect units in series.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	120			BPD-00012	DD-121	G044	811-121	UC-5312	5GA-T12	
C7	3.6									
C8	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C9	6.8			NP0-DI6.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-V68	
C10	3-12									
C11	1000								5TCCB-V22	
C12	2.2			NP0-SI2.2	TCZ-2R2	Z006	NP0A-2R2			
C13	.5-3				829-3		3115-01-0R5	CT565A		
C14	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C15	1.5			NP0-SI1.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	
C16	1000									
C17	.5-3				829-3		3115-01-0R5	CT565A		
C18	60									
C19	1.5			NP0-SI1.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-V15	Note 2 Note 3
C20	10									
C21	10									
C22	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C23	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C24	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C25	1000									
C26	1000									
C27	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C28	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C29	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C30	1000									
C31	.1	150	157906-1	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C32	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C33	15		158215-51				N330K-150			
C34	150		158215-35	N750-DI00015	TCN-150	N046	N750-337-151		5TCU-T15	
C35	.1	150	157906-1	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C36	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C37	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C38	820		158215-53	SI820	D6-821	K067	811-821		5GA-T82	
C39	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C40	820		158215-53	SI820	D6-821	K067	811-821		5GA-T82	
C41	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C42	150		158215-35	N750-DI00015	TCN-150	N046	N750-337-151		5TCU-T15	
C43	820		158215-53							
C44	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C45	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C46	1000		144675-28	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C47	3000		158215-18	BPD-003	DD-302	K076	811-003	UC-523	5HK-D3	
C48	33		137727-126	N080-SI33						
C49	68		137727-133							
C50	27		137727-1236							
C51	22		137727-128	N080-SI22						
C52	.1	150	157906-1	P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C53	.01	200	39001-13	BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C54	1000		158215-42							
C55	4000		158215-67							
C56	10000		158215-24	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C57	51		137727-28		TCN-51	TN15				
C58	10000		158215-57	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C59	10000		158215-57	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C60	33		137727-126	N080-SI33						

SET 317 FOLDER 4

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA CROSLEY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C61A	10000		158215-50	BPD-2X01	DD3-103	DK062	811-01	DC-511	5HK-251	
B	10000						811-01	DC-511		
C62	15		137727-43							
C63	1000		158215-17	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C64	.01	300	39001-13	BPD-01	D5-103	CUBM21	GP3-333-103	PT411	47M-61	
C65	1000		158215-17	BPD-001	DD-102	K069	801-001	DC-531	5HK-D1	
C66	.005	600	39001-16	DH3003	D6-503	CUBD25	GP2-333-502	PT615	67M-D5	
C67	.02	200	39001-80	BPD-02	DD-203	CUBS25	817-02	PT412	27M-S5	
C68	.002	600	39001-74	DH3002	D6-302	CUBS25	GP2-333-202	PT613	67M-D2	
C69	.004	600	39001-75	P68BN-008		CUBH38		PT628	67M-D6	
C70	.05	150	170280-1	BPD-05	DF-503	CUBS25		PT415	27M-S5	
C71	.002	600	39001-74	DH3002	D6-302	CUBS25	GP2-333-202	PT613	67M-D2	Note 5
C72	1500		158215-61							
C73	27		137727-136							
C74	.05	150	170280-1	BPD-05	DF-503	CUBS25		PT415	27M-S5	
C75	560		164675-33	DH-00056	DD-561	G063	811-561	UC-5356	5GA-T56	
C76	.033	200	39478-41							
C77	.022	400	39478-97							
C78	.047	400	39478-45							
C79	.01	600	39478-41							
C80	2000		158215-64	1464-002		1R5D2		MC8457	MS-23	
C81	51		137727-28				N750K-510			
C82	51		137727-28				N750K-510			
C83	1000		158215-42	1464-001		1R5D1	811-102	MC8255	MS-21	
C84	4000		158215-67	1464-004		1R5D4		MC8463	MS-24	
C85	.15	400	39001-20	P488N-15		CUB4P15		PT4015	47M-P15	
C86	1000		158215-42							
C87	.1	200	39001-19	P288N-1		DF-104	CUB2P1	PT401	27M-P1	
C88	680		137499-32	1464-00068		D6-681	1R5T68	811-681	MS-368	
C89	1500		137499-37	1464-0015			1R5D15		MS-315	
C90	.0015	400	39478-38	1464-0015			1R5D15	811-152	MC8356	MS-315
C91	.05	400	39001-17	BPD-05		DF-503	CUB4S5		PT415	47M-S5
C92	1000		158215-42							
C93	680		137499-32	1464-00068		D6-681	1R5T68	811-681	MS-368	
C94	68		158215-63							
C95	220		158215-03							
C96	.15	400	39001-20	P488N-15			CUB4P15		PT4015	47M-P15
C97	5000		164675-3	BPD-005		DD-502	K081	811-005	DC-5255	5HK-D5
C98	56	4000	158215-56							Note 4
C99	68	3000	158215-3	HVD-30-68		DD30-680	V3Q68	3KV-680	DC30468	30GA-Q68 Note 4
C100	1500		158215-61	1464-0015			1R5D15	811-152	MC8356	MS-315
C101	.08	200	159439-1							
C102	68	3000	158215-3	HVD-30-68		DD30-680	V3Q68	3KV-680	DC30468	30GA-Q68
C103	5000		164675-3	BPD-005		DD-502	K080	811-005	DC-525	5HK-D5
C104	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C105	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C106	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C107	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C108	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C109	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C110	1500		164675-30	BPD-0015		DD-152	K071	801-0015	DC-5215	5HK-D15
C111	10000		39001-18	BPD-01		DD-103	K063	811-01	DC-511	5HK-01

Note 2. Some versions may use 1MMF in this application.
Note 3. Some versions may use 8.2MMF in this application.
Note 4. Some versions may replace C99 and C99 with a 100MMF capacitor (part #158215-33). Other versions may use a 47MMF (part #158215-2) and an 82MMF (part #158215-32).
Note 5. Some versions may use a .0056MFD unit in this application.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CROSLEY Part No.	CENTRALAB Part No.	CLAROSTAT Part No.	IRC Part No	MALLORY Part No	Insulation Notes
R1A	500KΩ	½	B159860-3-1		A4723-500K			Volume tapped at 60KΩ
B	Shaft		Not Req.		FS-3			Attach to R1A.
C	Switch		Not Req.		SWE-21			Attach to R1A.
R2A	1.5Meg	½	B170104-1-1	AB-745	A47-1.5Meg-B	Q11-158	TA185L	Tone
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R2A.
R3	12KΩ	½	B159757-1-2					Contrast and area switch
R4A	800KΩ with 150K step	½	B159338-1-2	▪ B-89	▪ A47-1Meg-B	▪ Q11-137	▪ TA185L	Vert. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R4A.
R5A	5Meg	½	B159672-1-1	AB-87	A47-5Meg-B	Q11-141	TA185L	Height
B	Shaft		Not Req.	AK-1	FKS-½	Not Req.	Not Req.	Attach to R5A.
R6A	20KΩ	½	B159886-1-1	B-22	A47-20K-S	Q11-119	TA253L	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R6A.
R7A	2500Ω	2	B158706-1-1		A43-2500	WPS2500		Vert. Linearity Wire Wound Note 1
B	Shaft		Not Req.		FKS-½	Not Req.		Attach to R7A.
R7A	2500Ω	2	B159766-1-1		A43-2500	WPS2500		Vert. Linearity Wire Wound
B	Shaft		Not Req.		FKS-½	Not Req.		Attach to R7A.
R8	5Meg	½	B159871-1-1			Q17-141	TA56R	Brightness
R9A	40KΩ with 15K stop	½	B159863-1-1	† AB-31	† A47-40K-S	† Q11-120	† TA541	AGC Level
B	Shaft		Not Req.	AK-1	FKS-½	SQ	Not Req.	Attach to R9A.
R9A	40KΩ	½	B170501-1-1	AB-31	A47-40K-S	Q11-133	TA54L	AGC Level -Note 3
B	Shaft		Not Req.	AK-1	FKS-¼	SQ	Not Req.	Attach to R9A.
R10A	5Meg	½	B159875-1-1	AB-87	A47-5Meg-S	Q11-141	PTA56L	Noise Gate
B	Shaft		Not Req.	AK-1	FKS-½	SQ	Not Req.	Attach to R10A.
R11	5000	2	157955-2			39-500		Buzz-Wire Wound

Note 1. Some versions may use an alternate control Part No. B159768-1-1.
Note 2. On late production chassis this control is Part No. 170501-1. It is the same as Part No. 159863-1, but without the 15KΩ stop.
▪ Connect a 150KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
† Connect a 15KΩ resistor in series with the left hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No	NOTES
R12	680KΩ	½		BTS-680K	
R13	470Ω	½		BTS-470	
R14	560KΩ	½		BTS-560K	
R15	470KΩ	½		BTS-470K	
R16	220KΩ	½		BTS-220K	
R17	560Ω	½		BTS-560	Note 1
R18	10KΩ	½		BTS-10K	
R19	390Ω	½		BTS-390	
R20	47KΩ	½		BTS-47K	
R21	15KΩ	½		BTS-15K	
R22	22KΩ	1	39274-129	BTA-22K	Note 2

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No	NOTES
R23	10KΩ	2	39274-213	BTB-10K	
R24	100Ω	½	39274-25	BTS-100	
R25	470KΩ	½	39274-57	BTS-470K	
R26	100KΩ	½	39274-49	BTS-100K	Note 3
R27	1.5Meg	½	39274-65	BTS-1.5Meg	
R28	2.2Meg	½	39274-69	BTS-2.2Meg	
R29	220KΩ	½	39274-53	BTS-220K	
R30	220KΩ	½	39274-53	BTS-220K	
R31	220KΩ	½	39274-53	BTS-220K	
R32	470KΩ	½	39274-57	BTS-470K	
R33	470Ω	½	39274-33	BTS-470	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No	NOTES
R34	27KΩ	½	39274-42	BTS - 27K	
R35	470Ω	½	39274-41	BTS-470	Note 7
R36	47Ω	½	39274-9	BTS-47	Note 7
R37	680Ω	½	39274-33	BTS-680	
R38	27KΩ	½	39274-42	BTS-27K	
R39	120KΩ	½	39274-50		
R40	180KΩ	½	39274-52		
R41	470Ω	½	39275-41	BTS-470	
R42	27Ω	½	39274-6	BTS-27	Note 5
R43	470Ω	½	39275-41	BTS-470	
R44	470Ω	3	39274-21	BTS-470	
R45	82000Ω	½	156911-10		
R46	150Ω	½	39274-15	BTS-150	
R47	3900Ω	½	39274-32	BTS-3900	
R48	150Ω	½	39274-39	BTS-15K	
R49	100KΩ	½	39274-49	BTS-100K	
R50	15Ω	½	39274-3	BTS-15	
R51	4700Ω	2	39274-209	BTB-4700	
R52	10KΩ	½	39274-37	BTS-10K	
R53	3900Ω	2	39274-208	BTB-3900	
R54	4700Ω	1	39274-209	BTA-4700	
R55	150KΩ	½	39274-51	BTS-150K	
R56	47KΩ	½	39274-45	BTS-47K	
R57	47KΩ	½	39274-45	BTS-47K	
R58	270KΩ	½	39274-54	BTS-270K	
R59	220KΩ	½	39274-141	BTA-220K	
R60	68KΩ	½	39274-47	BTS-68K	
R61	150KΩ	½	39274-50	BTS-150K	
R62	680KΩ	½	39274-59	BTS-680K	
R63	390KΩ	½	39274-56	BTS-390K	
R64	100KΩ	½	39274-49	BTS-100K	
R65	15KΩ	½	39274-39	BTS-15K	
R66	560KΩ	½	39274-58	BTS-560K	
R67	180KΩ	½	39274-52	BTS-180K	
R68	3.3Meg	½	39274-73	BTS-3.3Meg	Note 3
R69	10KΩ	½	39274-37	BTS-10K	Note 6
R70	15KΩ	½	39274-39	BTS-15K	
R71	150Ω	½	39274-15	BTS-150	
R72	47KΩ	½	39274-45	BTS-47K	
R73	100Ω	½	39274-25	BTS-100	
R74	39KΩ	½	39274-44	BTS-39K	
R75	10Meg	½	39274-85	BTS-10Meg	
R76	2.2Meg	½	39274-69	BTS-2.2Meg	
R77	560KΩ	½	39274-58	BTS-560K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA CROSLEY Part No.	IRC Part No	NOTES
R78	27KΩ	½	39274-42	BTS - 27K	
R79	68KΩ	½	39274-47	BTS-68K	Note 7
R80	15KΩ	3	156911-11		Note 7
R81	470KΩ	½	39274-57	BTS-470K	
R82	470Ω	½	39274-109	BTA-470	
R83	220Ω	½	39274-17	BTA-220	
R84	1200Ω	½	39274-104	BTA-1200	
R85	330KΩ	½	39274-55	BTS-330K	
R86	470KΩ	½	39274-57	BTS-470K	
R87	15Meg	½	39274-87	BTS-15Meg	
R88	3.3Meg5%	½	39274-73	BTS-3.3Meg 5%	
R89	68KΩ	½	39274-47	BTS-68K	
R90	82KΩ	½	39274-48	BTS-82K	
R91	1Meg	½	39274-61	BTS-1Meg	
R92	2.2Meg	½	39274-69	BTS-2.2Meg	Note 8
R93	2.2Meg	½	39274-69	BTS-2.2Meg	Note 8
R94	68KΩ	½	39274-47	BTS-68K	
R95	470KΩ	½	39274-57	BTS-470K	
R96	150KΩ	½	39274-51	BTS-150K	
R97	560KΩ	3	170773-1	BTS-5600	
R98	680Ω	½	39274-23		
R99	680Ω	½	39274-23		
R100	1Meg	½	39274-61		
R101	1Meg	½	39274-61		
R102	1Meg	½	39274-61		
R103	22KΩ	½	39274-129		
R104	27KΩ	½	39274-42		
R105	100Ω	½	39274-25		
R106	47KΩ	½	39274-45		
R107	470Ω	½	39274-33		
R108	10KΩ	½	39274-125		
R109	22KΩ	½	39274-41	BTS-22K	
R110	27KΩ	½	39274-42		
R111	47KΩ	½	39274-45		
R112	100KΩ	½	39274-49	BTS-100K	
R113	6800Ω	½	39274-35	BTS-6800	
R114	100Ω	½	39274-13		
R115	470KΩ	½	39274-57		
R116	22Ω	½	39274-93		
R117	6800Ω	3	156911-5		
R118	470Ω	½	39274-33		
R119	22KΩ	2	39274-217	BTB-22K	
R120	33Ω	20	156230-4		
R121	7.5Ω	5	154089-1		

Note 1. Some versions may use 8.66Ω ½W resistor in this application.
Note 2. Used in chassis with 477 only.
Note 3. Not used in chassis with code "A".
Note 4. A 15KΩ ½W resistor is used on code "A" chassis in this application.
Note 5. A 47Ω ½W resistor is used on code "A" chassis in this application.
Note 6. A 12KΩ ½W resistor is used on code "A" chassis in this application.
Note 7. In some versions R79 and R80 are replaced with a 12KΩ 3W resistor. (Mfgr. #3-170773-3)
Note 8. Not used in some versions.

TRANSFORMER (PILOT LIGHT)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA CROSLEY PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC Tap ③ & 3V				157951-1	PS5U ①	PS244 ①	P6134 ①	21F08	F-13X

① Drill one new mounting hole.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	CROSLEY PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Vert. Osc. Trans.	170340-1	B6704 ①	A-3008 ①		V40S ②	A-8125 ②	26A03 ②	A-97X ②
T3	Horiz. Output Trans.	159947-2							
T4	Vert. Output Trans.	158726-2	21807	A-2824					
T5A	Yoke(90°)Horiz.(22MH)	158426-1 ③	DF807	MDF-92	2358D	Y90F1943	DY-16A	Y-16	Y-41-1
B	Vert. (40MH)	153588-1 ③	③③③	③③③	③③③	③③③	③③③	③③③	③③③

① Connect primary (yellow and black leads) between cathode and ground. Connect secondary (blue and green leads) between junction of capacitors C71 and C72 and ground. Connect terminal #2 of integrator to cathode (pin 8 of V11A). If no vertical sweep reverse either primary or secondary connections.
② Connect primary (red and blue leads) between cathode and ground. Connect secondary (green and yellow leads) between junction of capacitors C71 and C72 and ground. Connect terminal #3 of integrator to cathode (pin 8 of V11A). If no vertical sweep reverse either primary or secondary connections.
③ Does not include cover or beam centering magnets Crosley Part No. 153686-1.
④ Rear cover and centering device.
⑤ Use original rear cover and centering device.
⑥ Use original horizontal damping network.
⑦ To mount as original, loosen and rotate core clamp 180°. In this position connect horizontal damping capacitor across terminals #1 and #2, jumper terminals #3 and #5. To mount with leads at bottom connect horizontal damping capacitor across terminals #3 and #7, jumper terminals #1 and #3.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA CROSLEY Part No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No	NOTES
T6	7.3KΩ	3-4Ω	149460	Z1113	A3931	A3078	24S52	S-7X	

SPEAKER

ITEM No.	RATINGS SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA CROSLEY Part No.	QUAM Part No.	RCA TYPE No.	NOTES
SP1	8"x 12"	PM	3-4Ω	158734-3			

COILS (RF-IF)

ITEM No.	DC RES PRI.	DC RES SEC.	REPLACEMENT DATA CROSLEY Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	Ant. Matching Trans	0Ω					
L2	Ant. Matching Trans.	0Ω					
L3	FM Trap	0Ω					
L4	IF Trap	.1Ω					
L5	Ant., RF, Mixer Grid, Osc. Coils	0Ω					
L6	Pix. Choke	0Ω					
L7	Neut. Coil	0Ω					
L8	RF Coil	0Ω					
L9	Conv. Plate	.1Ω					
L10	Fil. Choke	0Ω	0Ω	150704-1	19-1000	4602	
L11	1st Video IF	.1Ω		159939-2			Includes resistor, capa., and 39.75MC Trap
L13	47.25MC Trap	0Ω		159933-1			
L13	Fil. Choke	0Ω		158704-1	19-1000	4602	
L14	RF Choke	0Ω		159947-1			
L15	2nd Video IF	.1Ω	.1Ω	170339-1	17-5003 *	TV-128 *	6233 * Includes 47.25MC Trap
L16	Fil. Choke	0Ω		158704-1	19-1000	4602	
L17	3rd Video IF	.1Ω	.1Ω	170357-1	17-5002 *	TV-127 *	6232 * Includes 41.25MC Trap
L18	RF Coil	1.8Ω		159442-1	19-1004	4610	
L19	Shunt Peaking Coil	8Ω		170465-1	19-3180	TV-184	6120 185 Microhenries
L20	Series Peaking Coil	6Ω		170468-1	19-3093 ▪	TV-181 ▪	6177 ▪ 92 Microhenries, Wound on 6.8KΩ resistor
L21A	4.5MC Trap	2.8Ω		159420-2			
B	1st Sound IF	.9Ω					
L22	Series Peaking Coil	6.5Ω		170691-1	19-3100 ▲		6112 ▲ 105 Microhenries, Wound on 22KΩ resistor Note 1
L23	Shunt Peaking Coil	8Ω		170467-1	19-3500		6138 480 Microhenries
L24	Quadrature Coil	16Ω		170652-1	19-3093	TV-181	6177 95 Microhenries, Not used in chassis 476, 477 Code A
L25	Series Peaking Coil	11.5Ω		159397-1	19-3250 ▪	TV-185 ▪	6130 ▪ 273 Microhenries, Wound on 12KΩ resistor- Note 2
L26	2nd Sound IF	L 8Ω	3.6Ω	170138-1			
L27	RF Coil	10.5Ω		159399-1	19-3250	TV-185	6181 250 Microhenries
L28	Quadrature Coil	5.2Ω		157843-1		1480	
L29	Fil. Choke	0Ω		159074-1 ·	19-1001	4604	
L30	RF Choke	6.3Ω		159483-1	19-3100 †	TV-181 †	6113 † 103 Microhenries, Wound on 1KΩ resistor

Note L. Part No. 170255-1 wound on 5.6KΩ resistor used in chassis 476, 477 Code A.
Note 2. Part No. 170468-1 wound on 10KΩ resistor used in chassis 476, 477 Code A.
▪ Use adaptor plate.
▲ Parallel with 5.6KΩ resistor.
• Parallel with 22KΩ resistor.
▪ Parallel with 12KΩ resistor.
† Parallel with 12Ω resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	RCA TYPE No.	Ram Part No.	Thordarson Part No.	NOTES
L31	225Ω		159943-1							Tapped @ 140Ω

FILTER CHOKE

ITEM No	RATINGS TOTAL DIRECT CURRENT	RATINGS D C RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA CROSLEY Part No.	Halldorson Part No.	Merit Part No	Stancor Part No.	Thordarson Part No.	Triad Part No.
L32	.250A	59Ω	1.18H	155529-4-1	C3040		C2327	28C41	C-21X

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA CROSLEY Part No.	FEDERAL Part No.	INTERNATIONAL Part No.	MALLORY Part No	RADIO RECEPTOR Part No.	SARKES TARZIAN Part No.	NOTES
M1	.350A	155575-2	1256A	MR300	8S300	6Q4	300	
M2	.250A	155575-2	1256A	MR300	8S300	6Q4	300	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA CROSLEY Part No.	ASTATIC Part No. CARTRIDGE	ASTATIC NEEDLE	ELECTRO-VOICE Part No. CARTRIDGE	ELECTRO-VOICE NEEDLE	REMARKS
M3	148694-313	55-T	GD-J	47	9-1 or 9-1 and 9-3	300

ASTATIC AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No	REPLACEMENT DATA CROSLEY Part No	JENSEN Part No	PERMO Part No	WALCO Part No	REMARKS
M4	148694-313	* S-67 or † S-68 or ▪† S-68D or ▪ S-68D	† AC-434 or ▪† AC-434D or † AC-434D3 or ▪ AC-434D	† W-757PS or ▪† W-757S or ▪ W-757PD	* Metal † Jewel ▪ Diamond

PARTS LIST AND DESCRIPTIONS (Continued)

CRYSTAL DIODES

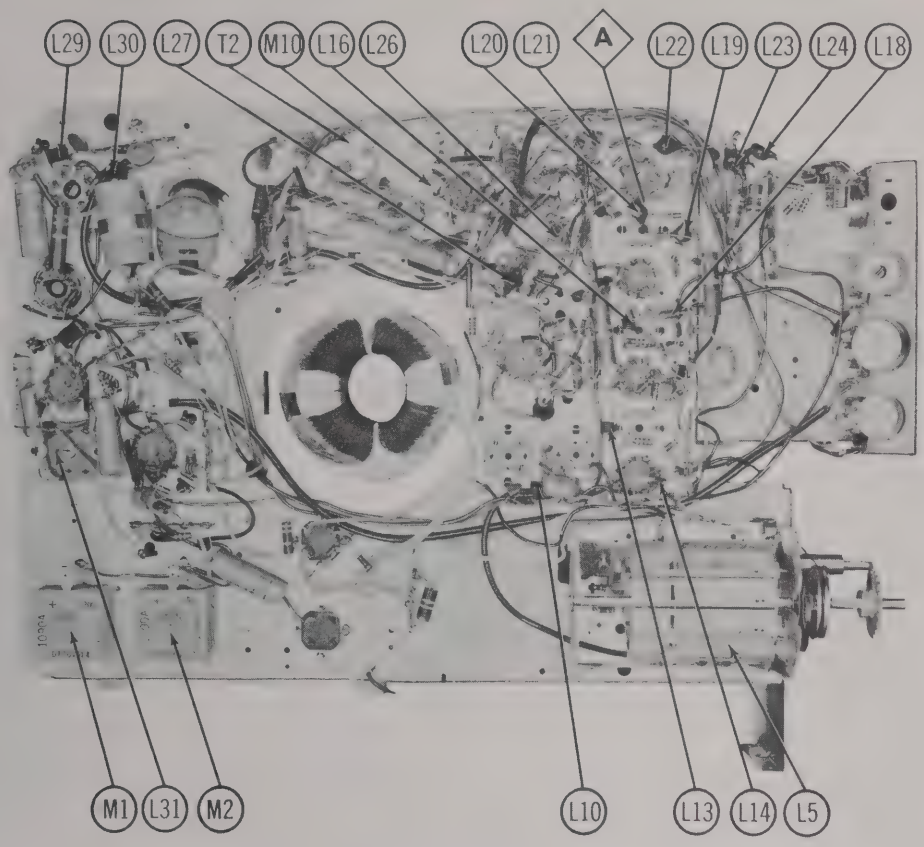
ITEM No.	ORIG. TYPE	REPLACEMENT DATA		NOTES
		CROSLEY PART No.	SYLVANIA PART No.	
M5	1N295 *	157465-5	1N60	Video Det.

* Some versions may use crystal diode type CK706A in this application.

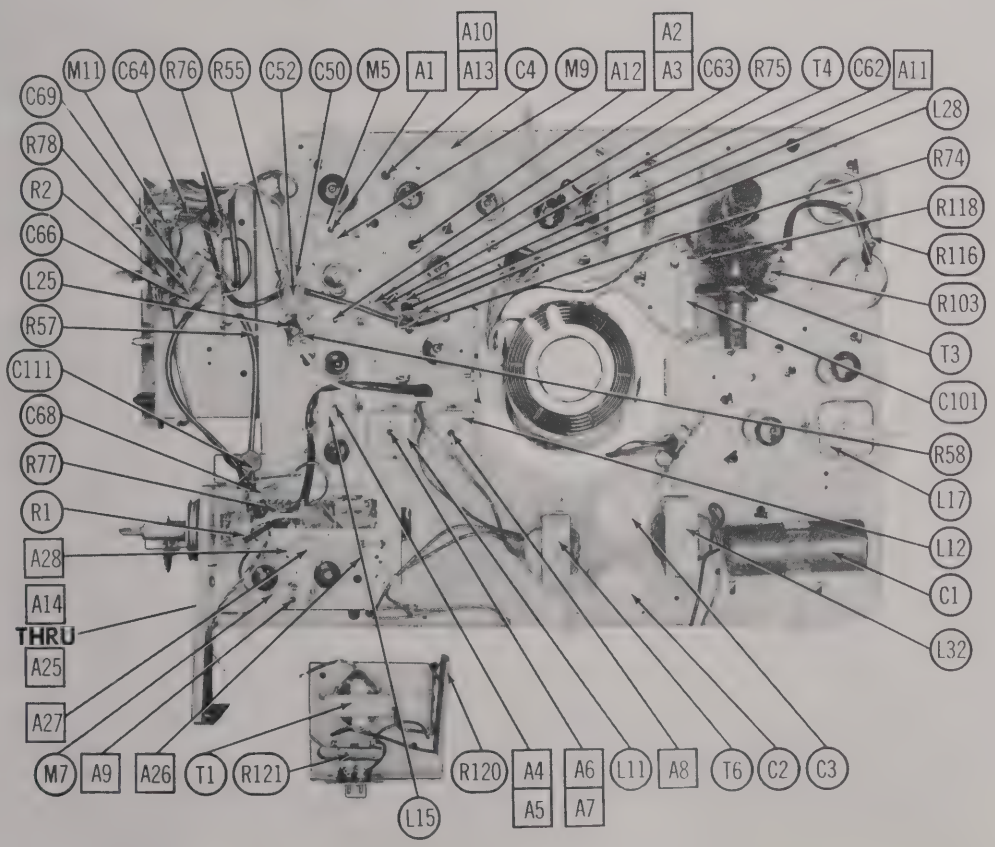
MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
M6	Pilot Light	170168-1	#1855
M7	Tuner	159725-1	VHF-Chassis 476
M8	Tuner	159698-1	VHF-UHF Combination-Chassis 477
M9	Video Det. Assy.	170499-1 *	Includes Coils & Capacitors; Less M5
M10	Integrator	170203-1	Vertical-Centralab Part No. PC-104, Sprague Part No. 103C12
M11	Switch	170187-1	Selector (6 Pole-2 Position; Rotary, Wafer Type)
M12	Centering Device	153586-1	Includes Deflection Yoke (T5) Rear Cover
M13	Ion Trap	153109-2	
B2	Trimmer Cap.	159882-1	Horiz. Drive (200-400MMF)
	Cabinet	170231-1	Models J-21LPKMF, J-21LPKMU
	Cabinet	170231-2	Models J-21LPKBF, J-21LPKBU
	Knob	159990-1	VHF Channel Selector (Mahogany)-Models J-21LPKMF, J-21LPKBF
	Knob	159990-2	VHF Channel Selector (Blond)-Models J-21LPKMF, J-21LPKBF
	Knob	170029-1	VHF Channel Selector (Mahogany)-Models J-21LPKMU, J-21LPKBU
	Knob	170029-2	VHF Channel Selector (Blond)-Models J-21LPKMU, J-21LPKBU
	Knob	170045-1	UHF Tuning (Mahogany)-Models J-21LPKMU, J-21LPKBU
	Knob	170045-2	UHF Tuning (Blond)-Models J-21LPKMU, J-21LPKBU
	Knob	159966-3	Selector Switch (Mahogany)-All Models
	Knob	159966-4	Selector Switch (Blond)-All Models
	Knob	159997-1	VHF Fine Tuning (Mahogany)-Models J-21LPKMF, J-21LPKBF
	Knob	159997-2	VHF Fine tTuning (Blond)-Models J-21LPKMF, J-21LPKBF
	Knob	159991-1	On-Off-Volume (Mahogany)- All Models
	Knob	159991-2	On-Off-Volume (Blond)-All Models
	Knob	159966-1	Contrast, Vert. Hold, Horiz. Hold, Brightness, Tone (Mahogany)-All Models
	Knob	159966-2	Contrast, Vert. Hold, Horiz. Hold, Brightness, Tone (Blond)-All Models
	Mask	170019-1	
	Safety Glass	159054-5	

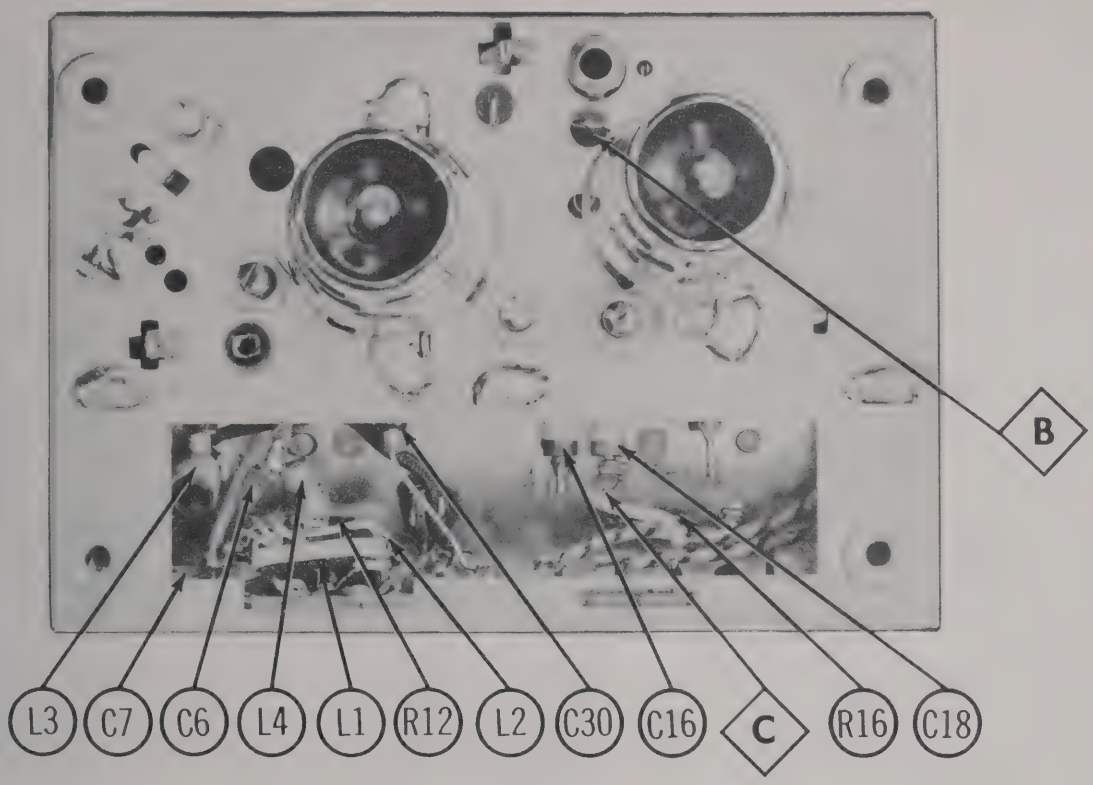
* Alternate Part No. 170346-1.



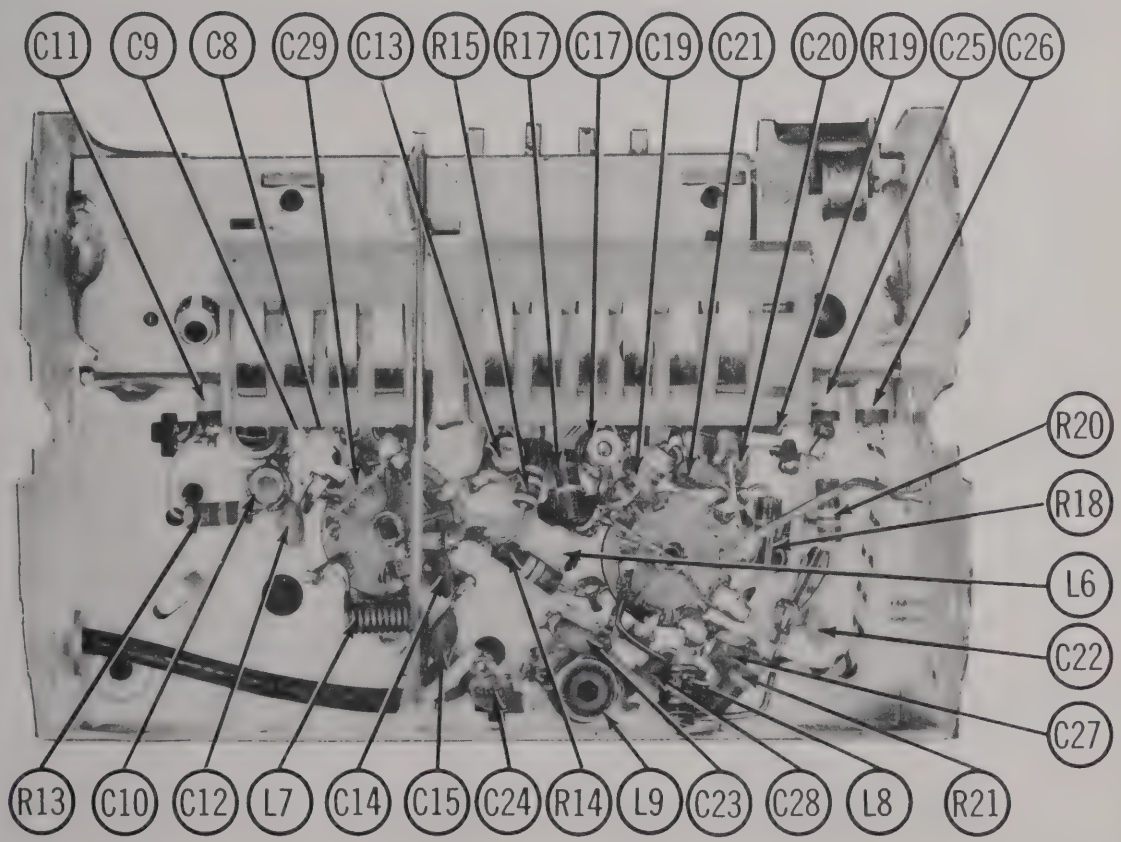
CHASSIS TOP VIEW



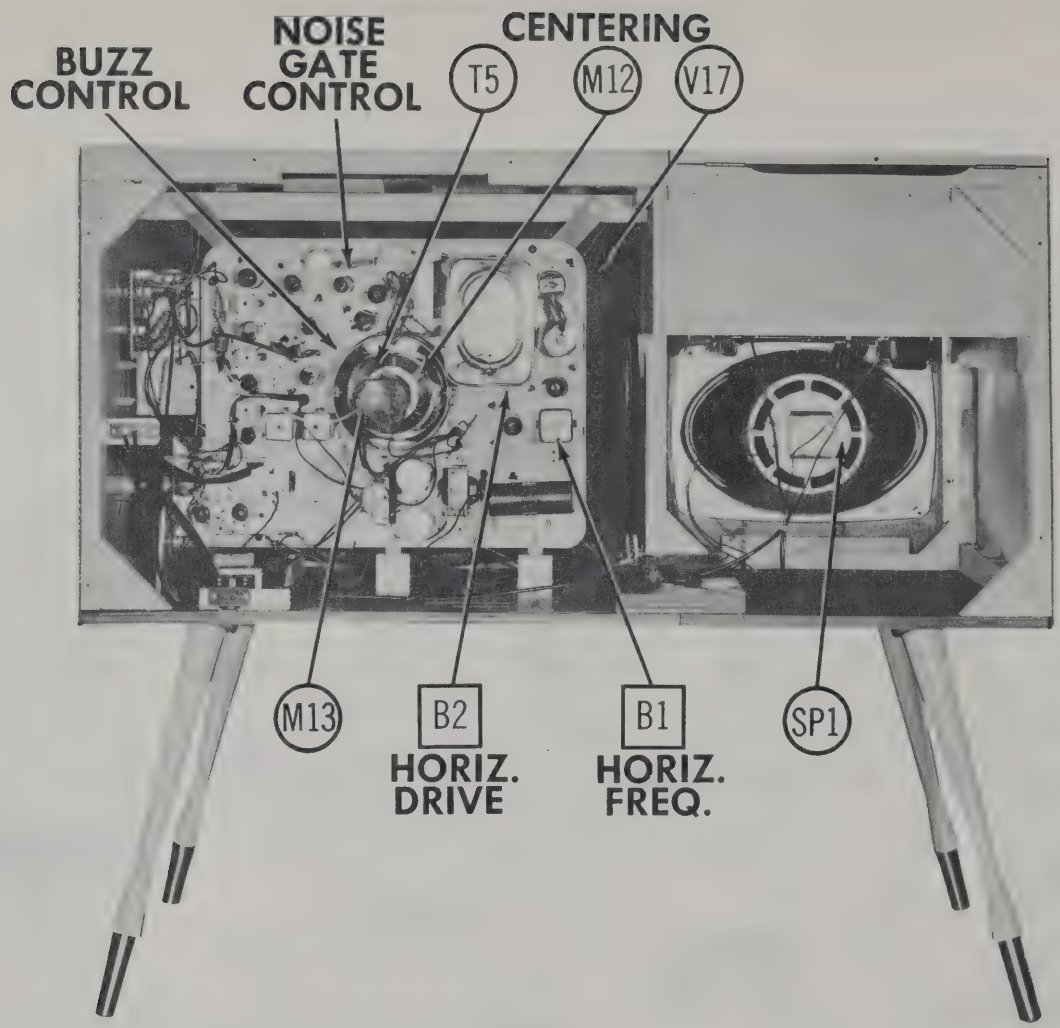
CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

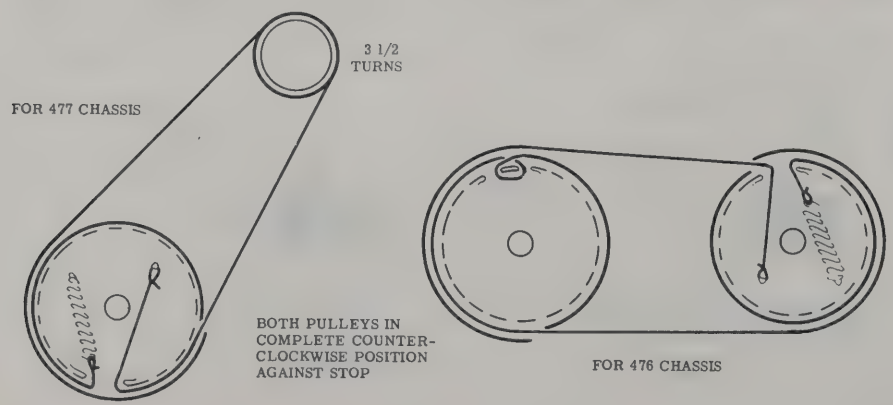
1. Set the horizontal hold control fully clockwise. Adjust the horizontal frequency slug B1 until picture locks in. (Be sure that noise gate is not advanced too far.)

2. Adjust B1 counter clockwise until picture goes out of sync.

3. Adjust B1 slowly clockwise until picture just falls into sync.

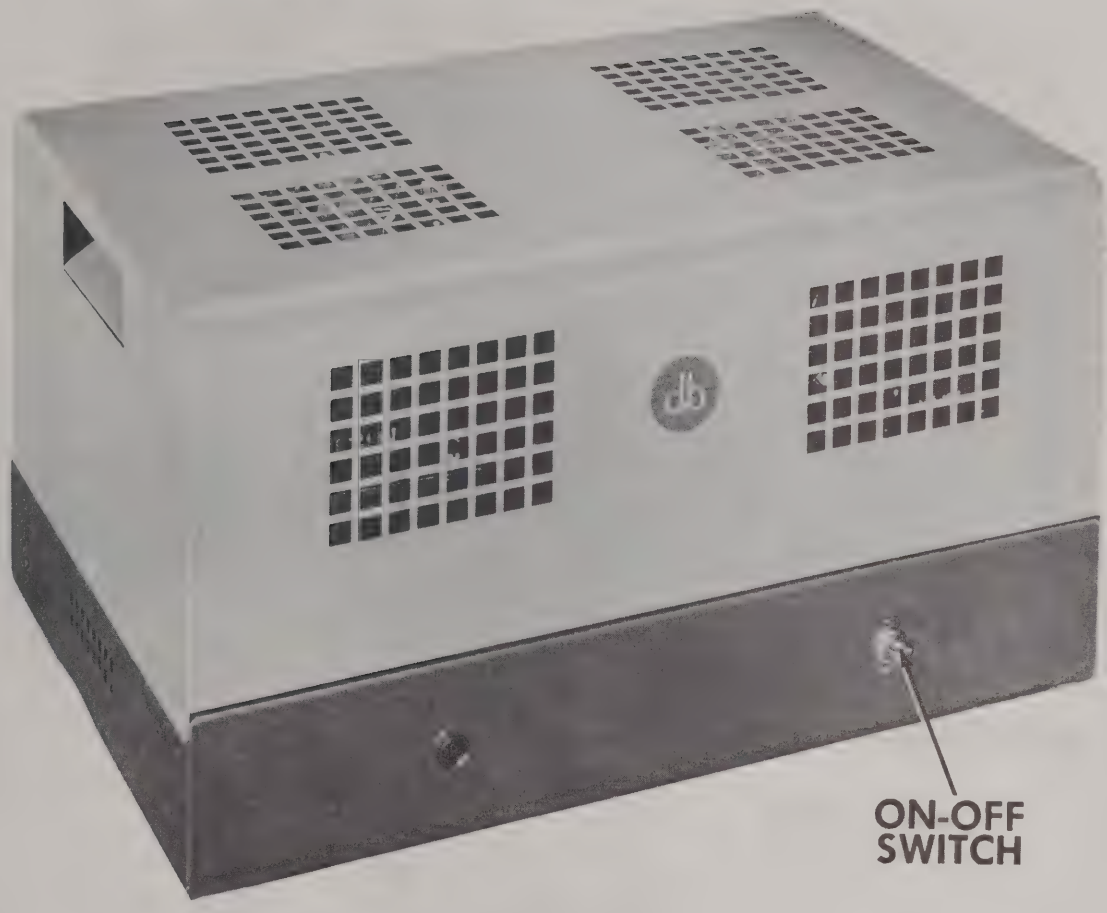
4. Adjust horizontal hold control to the center of its range. When the horizontal frequency slug B1 is properly adjusted, the picture will remain in sync when the channel switch is turned off channel and back again. with the horizontal hold control set near either end of its range.

5. Using metallic screw driver. turn the horizontal drive trimmer (B2) clockwise until a bright vertical line appears in the picture, then counter clockwise until the line just disappears.



UHF DRIVE CORD STRINGING

DAVID BOGEN
MODEL J0100



DAVID BOGEN
MODEL J0100

TRADE NAME	David Bogen Model J0100
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N. Y.
TYPE SET	AC Operated 100 Watt Audio Amplifier
TUBES (Eight)	Types 6SL7GT AF Amplifier-Phase Inverter, (2) 6SN7GTB Driver, (2) 807 Output, 6SN7GTB Volt. Regulator, 5Y3GT Rectifier, 5R4GY Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.38 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL J0100

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: David Bogen PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	AF Amplifier-Phase Inverter	6SL7GT	6SL7GT	
V2	Driver	6SN7GTB	6SN7GTB	6SN7GT may be used as an alternate.
V3	Driver	6SN7GTB	6SN7GTB	6SN7GT may be used as an alternate.
V4	Output	807	807	
V5	Output	807	807	
V6	Voltage Regulator	6SN7GTB	6SN7GTB	6SN7GT may be used as an alternate.
V7	Rectifier	5Y3GT	5Y3GT	
V8	Rectifier	5R4GY	5R4GY	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: David Bogen PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	2	1000	(Note 1)					4110-2	
C2A	8	500			BR850	TC82			TVA-1902
B	8	500			BR850	TC82			TVA-1902
C3	10	450		PRS450V10	BR1045	TC72	TD-10-450	FM-4510	TVA-1705
C4	50	50		PRS50V50	BR505	TC39	TD-50-50	FM-0550	TVA-1308
C5	50	50		PRS50V50	BR505	TC39	TD-50-50	FM-0550	TVA-1308
C6	50	50		PRS50V50	BR505	TC39	TD-50-50	FM-0550	TVA-1308

Note 1. C1 is a paper capacitor.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C7	15			BPD-000015	DD-150	G021	831-150	UC-5415	5GA-Q15	
C8	47			BPD-000047	DD-470	G033	831-470	UC-5447	5GA-Q47	
C9	220			BPD-00022	D6-221	G051	811-221	UC-5322	5GA-T22	
C10	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C11	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C12	.047	400		BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C13	.047	600		BPD-05	DF-503	CUB6S47		PT6147	6TM-S47	
C14	.25	1200								

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: David Bogen PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	V275A	AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R1A.
R2A	500KΩ	½	V275A	AB-60	A47-500K-Z	Q13-133	U-48	Regulator Bias
B	Shaft		Not Req.	AK-1	FKS-1/4	Not Req.	Not Req.	Attach to R2A.

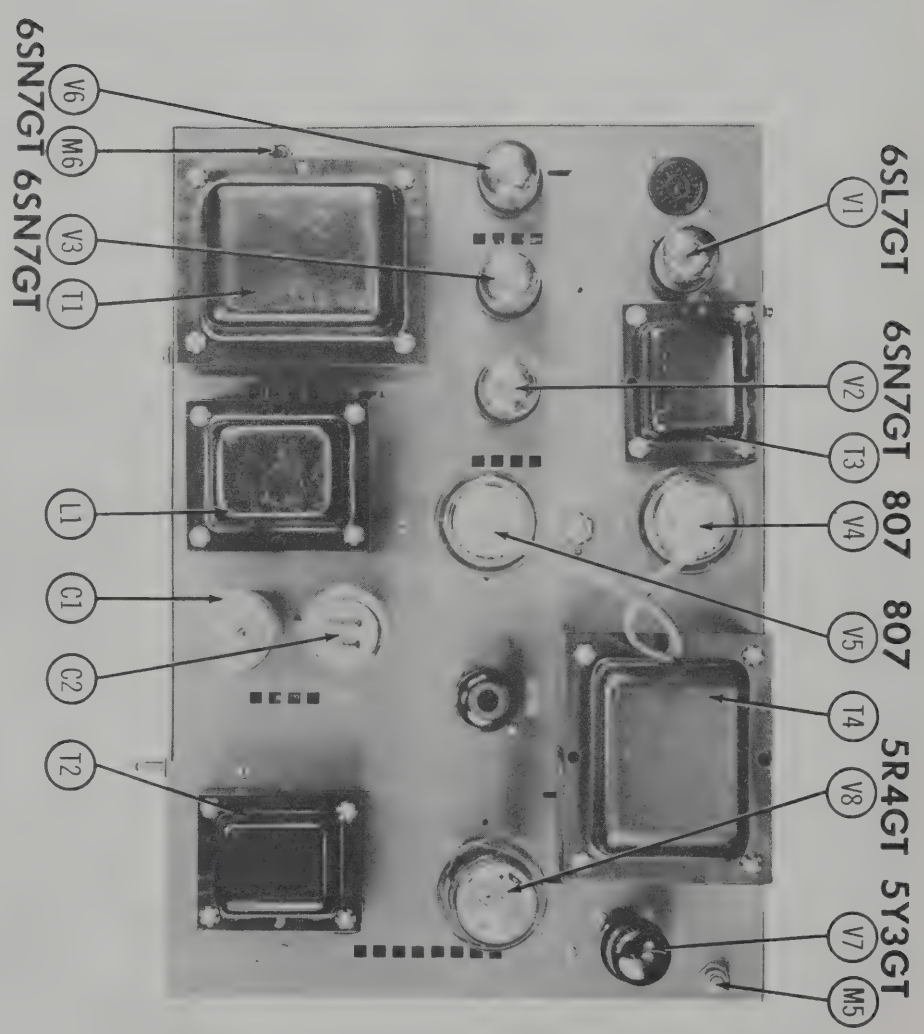
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: David Bogen PART No.	IRC PART No.	NOTES
R3	47KΩ	½		BTS-47K	
R4	220KΩ	½		BTS-220K	
R5	680Ω	½		BTS-680	
R6	2200Ω	½		BTS-2200	
R7	.47Ω	2½		BW½-.47	
R8	33KΩ	½		BTS-33K	
R9	47KΩ	½		BTS-47K	
R10	220KΩ	½		BTS-220K	
R11	3900Ω	½		BTS-3900	
R12	680KΩ	½		BTS-680K	
R13	220KΩ	½		BTS-220K	
R14	680KΩ	½		BTS-680K	
R15	470Ω	½		BTS-470	
R16	470Ω	½		BTS-470	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: David Bogen PART No.	IRC PART No.	NOTES
R17	10KΩ	½		BTS-10K	
R18	1000Ω	2		BTB-1000	
R19	68KΩ	2		BTB-68K	
R20	47KΩ	1		BTA-47K	
R21	1.5Meg	2		BTB-1.5Meg	
R22	200KΩ 5%	2		BTB-200K 5%	
R23	100KΩ	½		BTS-100K	
R24	1000Ω	10		1 ¾AA-1000	
R25A	10KΩ	50	♦	4½EA-50K	
B	40KΩ	50			
R26	22Ω	½		BTS-22	
R27	22Ω	½		BTS-22	
R28	47KΩ	½		BTS-47K	
R29	47KΩ	½		BTS-47K	

♦ Items R25A, R25B are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .46A	1800VCT @ .046A	630VCT @ .094A							

TRANSFORMER (FILAMENT)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	117VAC @ .9A	5VAC @ 2A	5VAC @ 2A	6.3VAC @ 3.8A						

TRANSFORMER (INTERSTAGE)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T3	RES. 140ΩCT									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	1.49KΩ CT	140V Tap @ 105V @ 70V							

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	David Bogen PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L1	.094A	187Ω	6HY				C1710 ①	20C64 ①	C-11X ①
L2	.064A	95Ω	8.2HY				C1421 ②		

① Drill one new mounting hole.
② Drill new mounting holes.

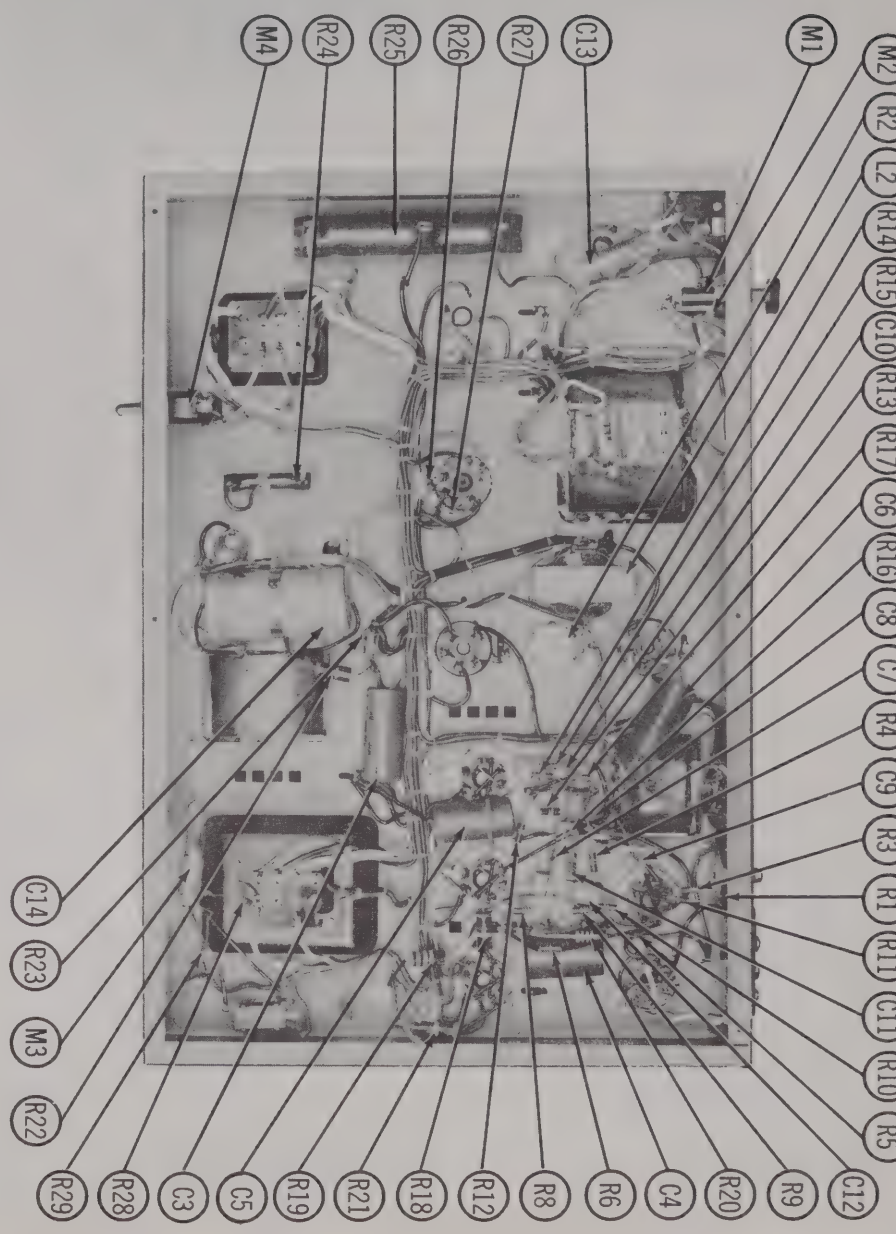
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			David Bogen PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	5A			313005. (3AG S/B 5A)	342001	MDL5	HKP
M2	3AG S/B	1½A			3130L.6 (3AG S/B 1.6/10A)	342001	MDL 1½	HKP

MISCELLANEOUS

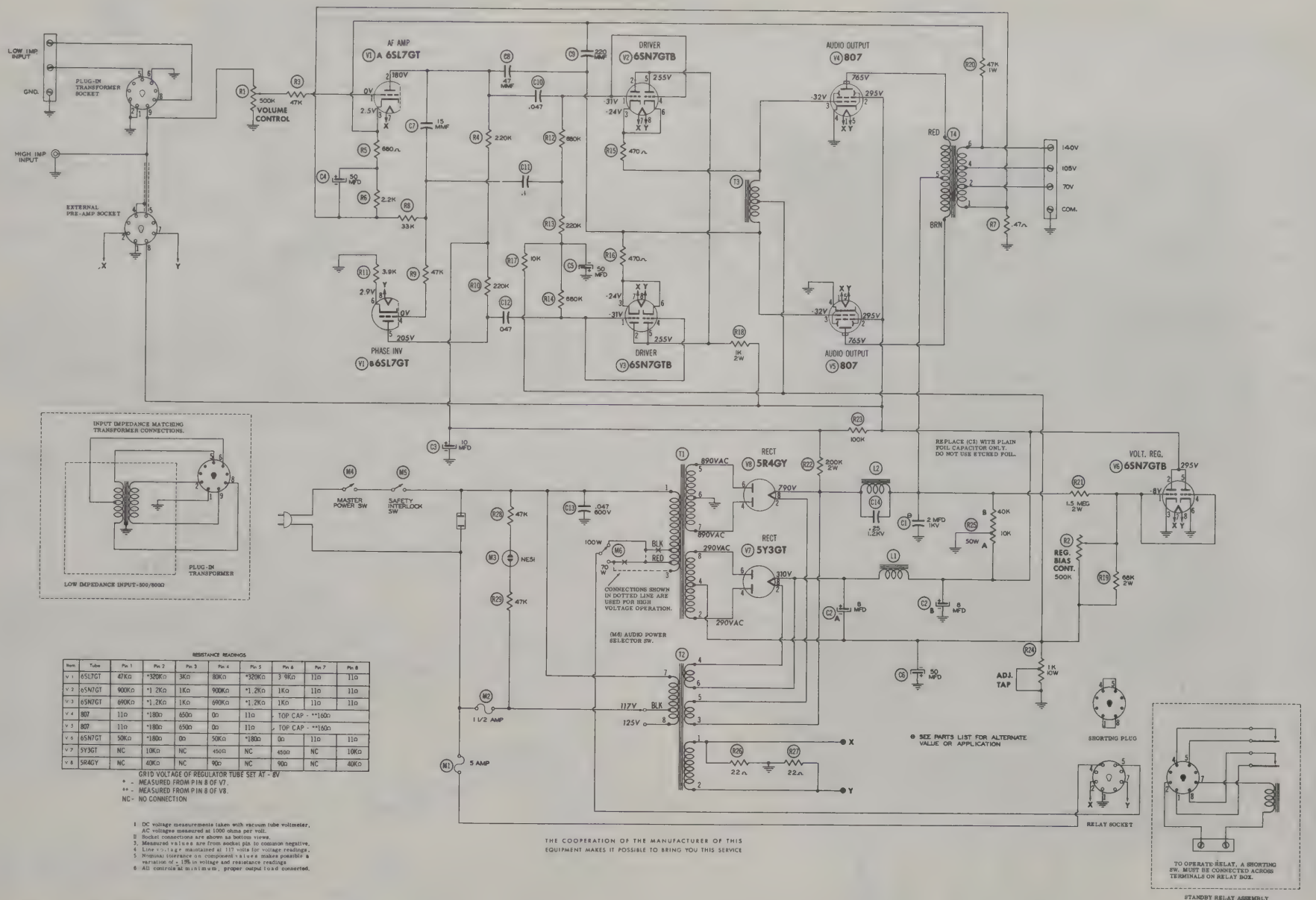
ITEM No.	PART NAME	David Bogen PART No.	NOTES
M3	Pilot Light		#NE51
M4	Switch	S191A	On-Off (Master Power)-Toggle Type, SPST
M5	Switch	S309B	Safety Interlock (Push button Type, SPST)
M6	Switch	S395A	Audio Power Selector (Toggle Type, SPDT)

CHASSIS—BOTTOM VIEW



DAVID BOGEN MODEL J0100

DAVID BOGEN MODEL J0100



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6SL7GT	47KΩ	*320KΩ	3KΩ	80KΩ	*320KΩ	3.9KΩ	11Ω	11Ω
V 2	6SN7GT	900KΩ	*1.2KΩ	1KΩ	900KΩ	*1.2KΩ	1KΩ	11Ω	11Ω
V 3	6SN7GT	690KΩ	*1.2KΩ	1KΩ	690KΩ	*1.2KΩ	1KΩ	11Ω	11Ω
V 4	807	11Ω	*180Ω	650Ω	0Ω	11Ω	TOP CAP - **160Ω		
V 5	807	11Ω	*180Ω	650Ω	0Ω	11Ω	TOP CAP - **160Ω		
V 6	6SN7GT	50KΩ	*180Ω	0Ω	50KΩ	*180Ω	0Ω	11Ω	11Ω
V 7	5Y3GT	NC	10KΩ	NC	450Ω	NC	450Ω	NC	10KΩ
V 8	5R4GY	NC	40KΩ	NC	90Ω	NC	90Ω	NC	40KΩ

GRID VOLTAGE OF REGULATOR TUBE SET AT - 8V
* - MEASURED FROM PIN 8 OF V7.
** - MEASURED FROM PIN 8 OF V8.
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. All controls at minimum, proper output load connected.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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PHOTOFACT* Folder

FIRESTONE 13-G-165, 13-G-186 (Code 280-5-17T23)

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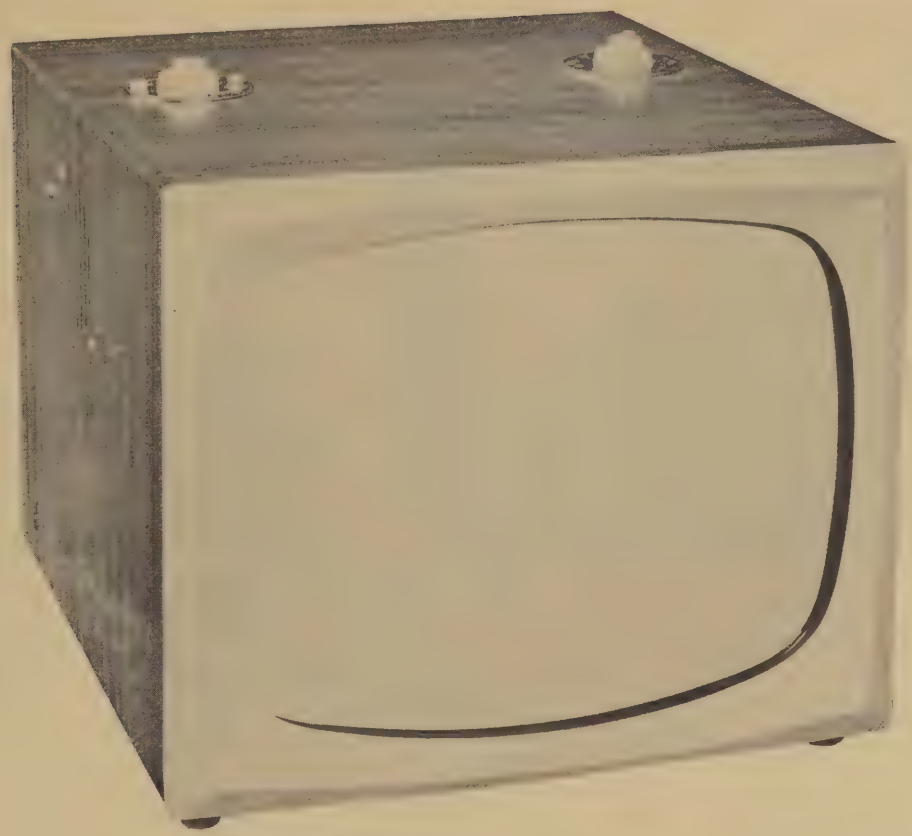

FIRESTONE MODEL 13-G-186

TRADE NAME	Firestone Models 13-G-165, 13-G-186 (Code 280-5-17T23)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Parkway, Akron, Ohio
TYPE SET	Television Receiver
TUBES	Fifteen
POWER SUPPLY	105-115 Volts AC-60 Cycle
RATING	1.36 Amp. @ 115 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 26.75MC, Sound IF 22.25MC (Intercarrier)

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FIRESTONE 13-G-165, 13-G-186 (Code 280-5-17T23)

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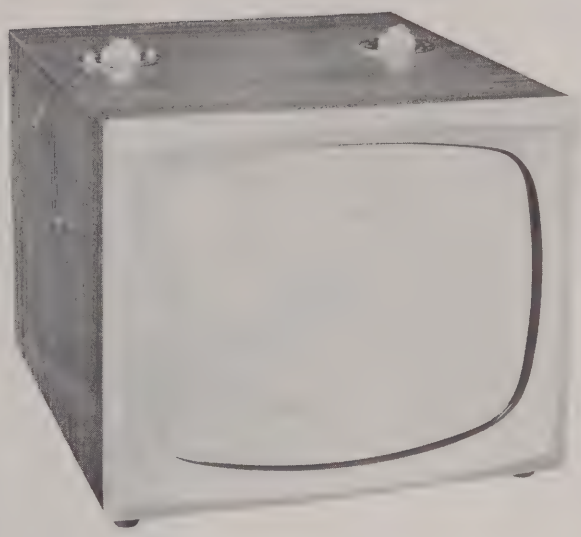
DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from top panel of cabinet.
2. Remove 4 metal screws. Remove rear cover.
3. Place cabinet face down on a soft surface.
4. Remove 2 metal screws holding AC interlock and antenna bracket.
5. Remove 2 bottom chassis bolts and return receiver to normal upright position.
6. Disconnect speaker leads, yoke leads and picture tube socket.
7. Remove ion trap and centering magnet removing 2 metal screws. Remove yoke assembly.
8. Remove 2 metal screws from each side of cabinet.
9. Remove chassis by pulling straight out from cabinet.
10. Remove 2 speaker nuts. Remove speaker.



MODELS
13-G-165, 13-G-186 (Code 280-5-17T23)

FIRESTONE 13-G-165, 13-G-186 (Code 280-5-17T23)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. Also, remove 2 metal screws and remove escutcheon plate. Adjustments are accessible, one at a time, thru the small hole in the chassis to the rear of the channel selector shaft.

PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the chassis. Adjustment is located on the tube side of the chassis. Set the horizontal hold control to the center of its range and adjust the horizontal phase slug (L24) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the buzz control (R7) located on the tube side of the chassis for maximum volume and minimum buzz.

HORIZONTAL SIZE CONTROL

Horizontal size control is a brass sleeve located on the neck of the picture tube and slides between the yoke and the picture tube. Push sleeve into yoke to decrease size and pull out to increase size.

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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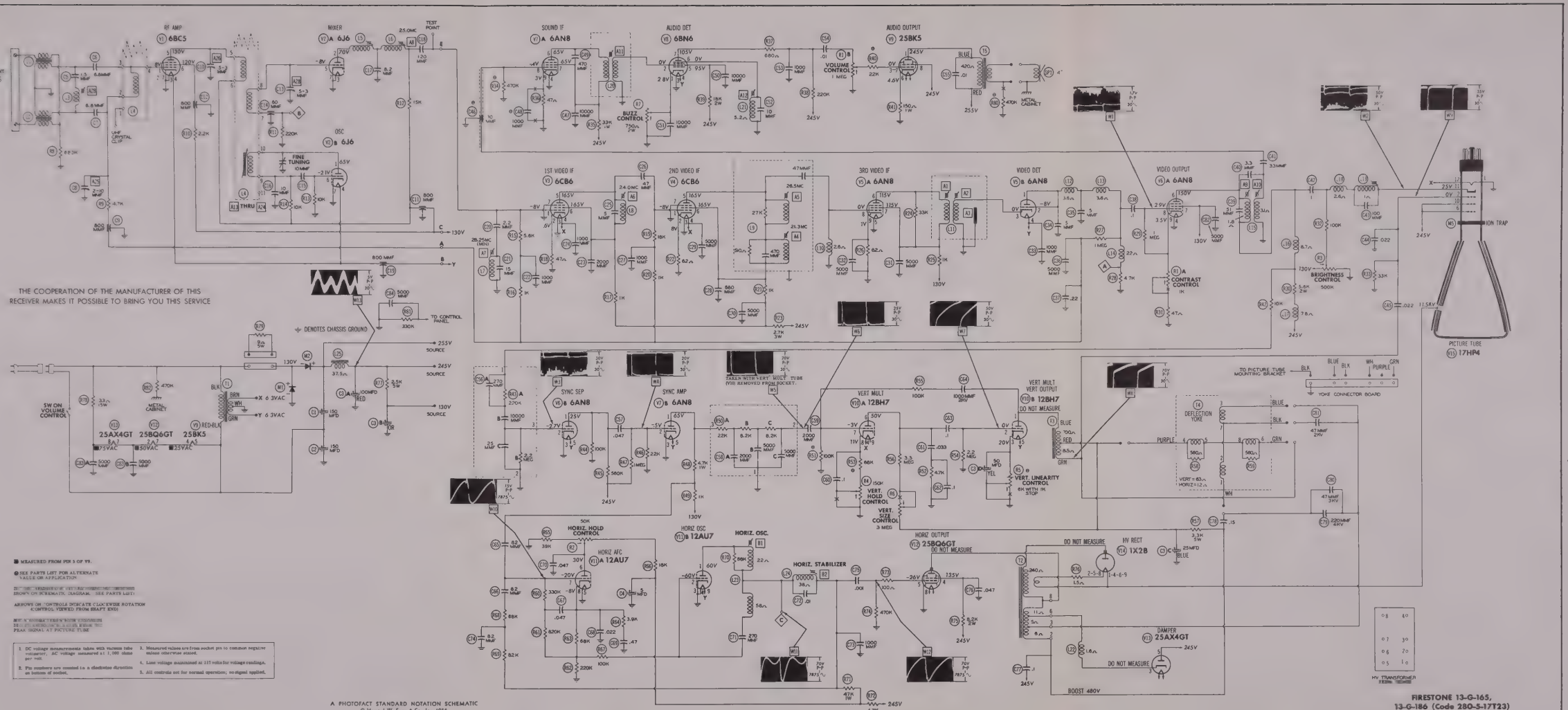
RF AMP. V1 6BC5
MIXER V2A 6J6
OSC V2B 6J6
SOUND IF V1A 6AN8
AUDIO DET V5 6BN6
AUDIO OUTPUT V5 25BK5
1ST VIDEO IF V3 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5A 6AN8
VIDEO DET V5B 6AN8
VIDEO OUTPUT V6A 6AN8
SYNC SEP V6B 6AN8
SYNC AMP V7B 6AN8
VERT MULT V10A 12BH7
VERT MULT VERT OUTPUT V10B 12BH7
HORIZ OSC V11B 12AU7
HORIZ AFC V11A 12AU7
HORIZ. OSC.
HORIZ. STABILIZER
HORIZ OUTPUT V12 25BQ6GT
HV RECT V14 1X2B
DAMPER V13 25AX4GT
PICTURE TUBE V15 17HP4
ION TRAP
BRIGHTNESS CONTROL 500K
CONTRAST CONTROL 1K
VOLUME CONTROL 1 MEG
BUZZ CONTROL 750A 2W
VERT. HOLD CONTROL 150K
VERT. SIZE CONTROL 3 MEG
VERT. LINEARITY CONTROL 6K WITH IK STOP
HORIZ. HOLD CONTROL 50K
HORIZ. STABILIZER
DEFLECTION YOKE
YOKE CONNECTOR BOARD
TO PICTURE TUBE MOUNTING BRACKET
TO CONTROL PANEL
DENOTES CHASSIS GROUND
SW ON VOLUME CONTROL
25AX4GT 25BQ6GT 25BK5
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DO NOT MEASURE
BOOST 480V
HV TRANSFORMER
TAKEN WITH VERT. MULT TUBE (V10) REMOVED FROM SOCKET.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
2. Pin numbers are counted in a clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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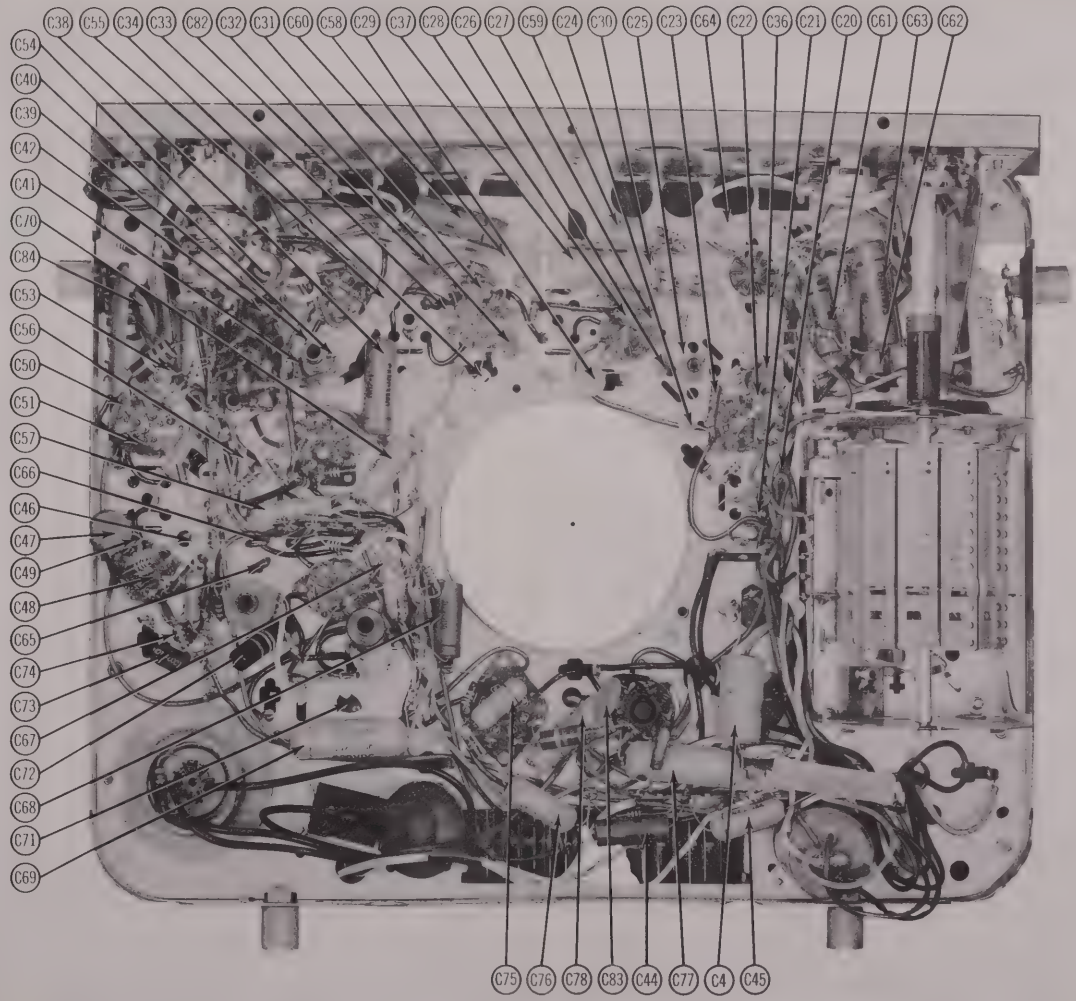
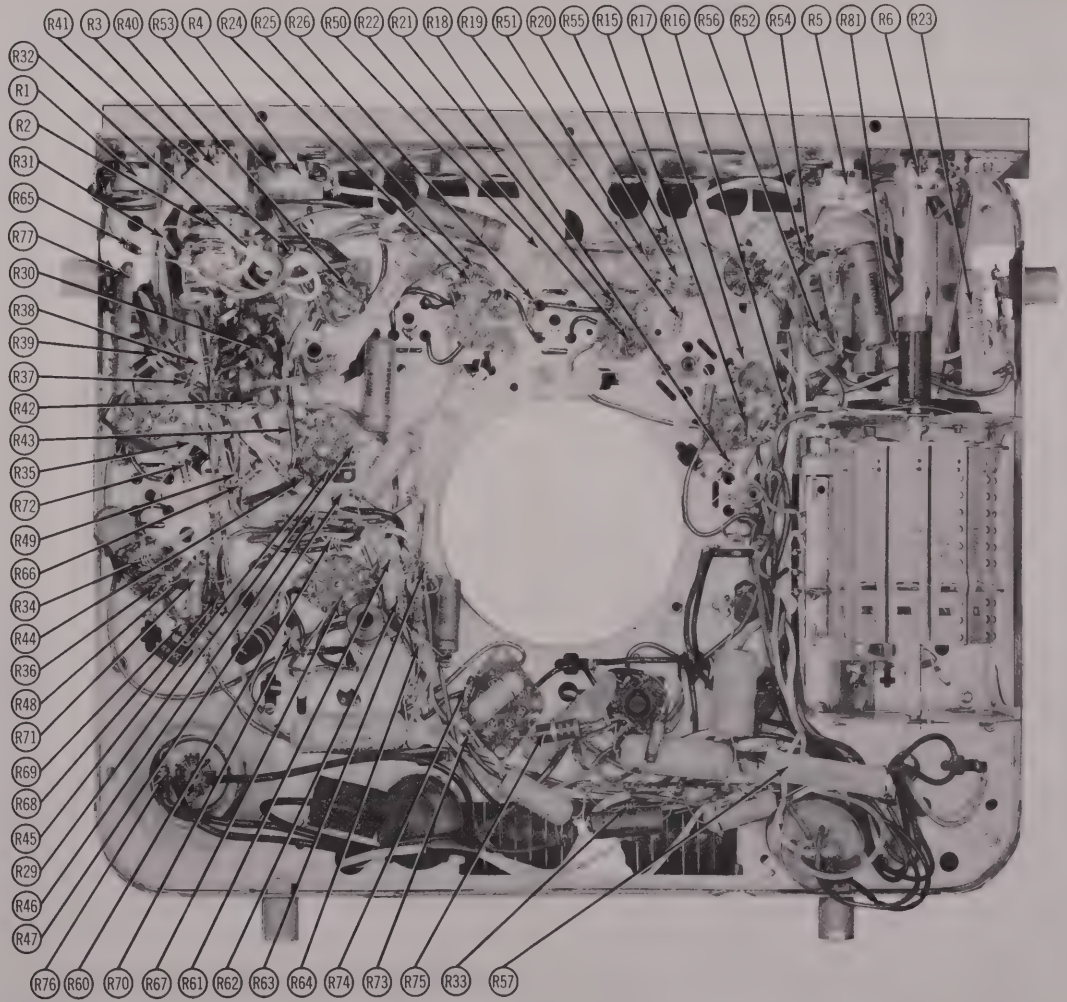
FIRESTONE 13-G-165, 13-G-186 (Code 280-5-17T23)

FIRESTONE 13-G-165, 13-G-186 (Code 280-5-17T23)

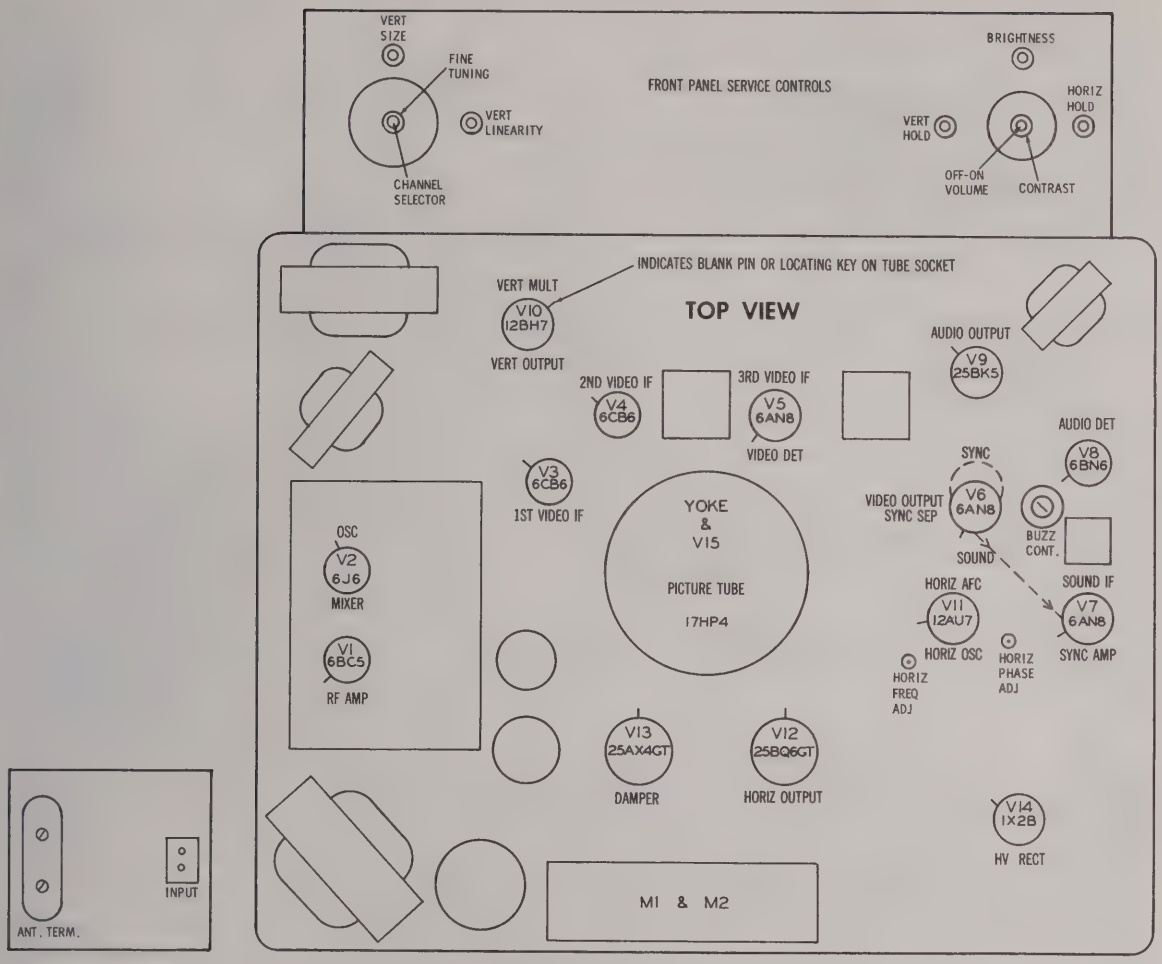


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

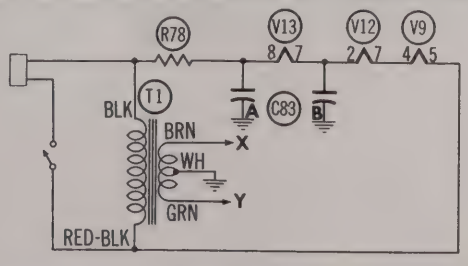
POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V15
Has pic, no sound - V7, V8, V9

SYNC FAILURE
No vert. sync - V7, V10
No horiz. sync - V7, V11
No vert. or horiz. sync - V6, V7

SWEEP FAILURE
No raster, has sound - V11, V12, V13, V14, V15
No vertical deflection - V10
Poor vert. linearity or foldover - V10
Poor horiz. linearity or foldover - V11, V12, V13
Narrow picture - V11, V12, V13, V14, M1, M2
Vert. off freq. - V7, V10
Horiz. off freq. - V7, V11

NOTE: Since this receiver employs tubes used in a series-parallel filament network, an open filament in any tube in series may cause the set to be inoperative. (See Circuit below).



SET 317 FOLDER 6

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage lead should be securely taped away from the chassis.
Do not remove the horizontal oscillator tube V11 to disable the high voltage.

VIDEO IF ALIGNMENT

Remove the oscillator-mixer tube (V2) and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 8 (grid) of 6AN8 (V5). Low side to chassis.	25MC (10MC Swp)	23.9MC 26.3MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2, A3	Connect a short jumper from pin 5 (plate) to pin 6 (screen) of 6CB6 (V4). Adjust for response similar to Fig. 1 with markers at 90%. A3 is a coupling rod and affects bandwidth. Remove short from pin 5 to pin 6 of V4.
2.	Direct	High side to an ungrounded tube shield floating over oscillator-mixer tube. Low side to chassis.	Not used	21.3MC (Unmod)	"	USE VTVM. DC probe to point (A). Common to chassis.	A4	Adjust for maximum deflection.
3.	"	"	"	26.5MC	"	"	A5	Adjust for maximum deflection. Repeat step 2.
4.	"	"	"	24.0MC	"	"	A6	Adjust for maximum deflection. Attenuate generator to maintain not more than 2 volts deflection on VTVM.
5.	"	"	"	28.25MC	"	"	A7	Adjust for MINIMUM deflection.
6.	"	"	"	25.0MC	"	"	A8	Adjust for maximum deflection. Attenuate generator to maintain not more than 2 volts deflection on VTVM. Repeat step 5.
7.	"	"	25MC (10MC Swp)	21.3MC 23.8MC 26.65MC	"	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response similar to Fig. 2. Rock A8 for flat response. Increase sweep generator output and use high scope gain to view 22.25MC trap region. Adjust A4 so that 21.25 MC appears at peak of pop-up portion preceding trap notch. 22.25MC should fall in trap notch. If response is not similar to Fig. 2, repeat steps 1 thru 7.

SOUND IF ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Tune in a TV station and adjust the fine tuning control until sound bars just appear in the picture. Adjust A9 fully counter clockwise and then clockwise until the horizontal scanning line are smooth and continuous.
Readjust the fine tuning control for clearest picture and best sound. Insert and attenuator in series with the antenna and the receiver antenna terminals so that the signal may be varied from weak to strong. If a suitable attenuator is not available, stray feed the signal to the set by placing the antenna lead-in near the antenna terminals of the receiver.
Reduce the signal input to the receiver so that the signal falls below the limiting level of the 6BN6 limiter-detector as evidenced by a "HISS" in the sound. Adjust the secondary of the sound take-off transformer (A10), the sound IF transformer (A11), the quadrature coil (A12) and the buzz control R7 for maximum sound and minimum buzz. If the hiss disappears during alignment, increase attenuation until the hiss reappears.

OSCILLATOR ALIGNMENT

The channel oscillator screws are reached through a hole just to the rear of the fine tuning shaft. The correct oscillator adjustment screws are accessible through this hole as the channel switch is turned to each channel. Connect the negative lead of a 1.5 volt bias battery to the ungrounded side of C37. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 3. Use high scope gain and increase sweep generator output to view trap region. Video marker should fall at 50% on response curve.
			213MC (10MC Swp)	211.25MC 215.75MC	13		A14	
			207MC (10MC Swp)	205.25MC 209.75MC	12		A15	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

ALIGNMENT INSTRUCTIONS (cont)

RF AND MIXER ALIGNMENT

Leave the bias battery connected as under "Video IF Alignment".
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	195MC (10MC Swp)	193.25MC 197.75MC	10	Vert. Amp. thru 10KΩ to point (B). Low side to chassis.	A25, A26, A27	Adjust for response similar to Fig. 4 with marker at 90% .
10.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"		Check for response similar to Fig. 4. If markers fall below 70% on any channel, make SLIGHT compromise adjustment of A26, A27 and A28 with channel selector set for that channel. Recheck all other channels to see that they have not been seriously affected.
			213MC (10MC Swp)	211.25MC 215.75MC	13			
			207MC (10MC Swp)	205.25MC 209.75MC	12			
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			
11.	"	"	Not used	105MC	2	Use VTVM DC probe to point (A). Common to chassis.	A28	Adjust for MINIMUM deflection.

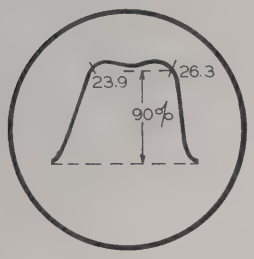


FIG. 1

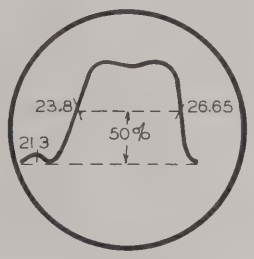


FIG. 2

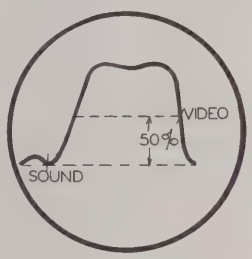


FIG. 3

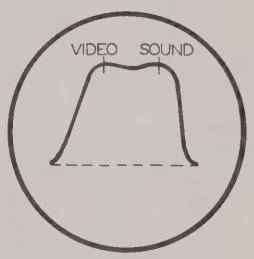
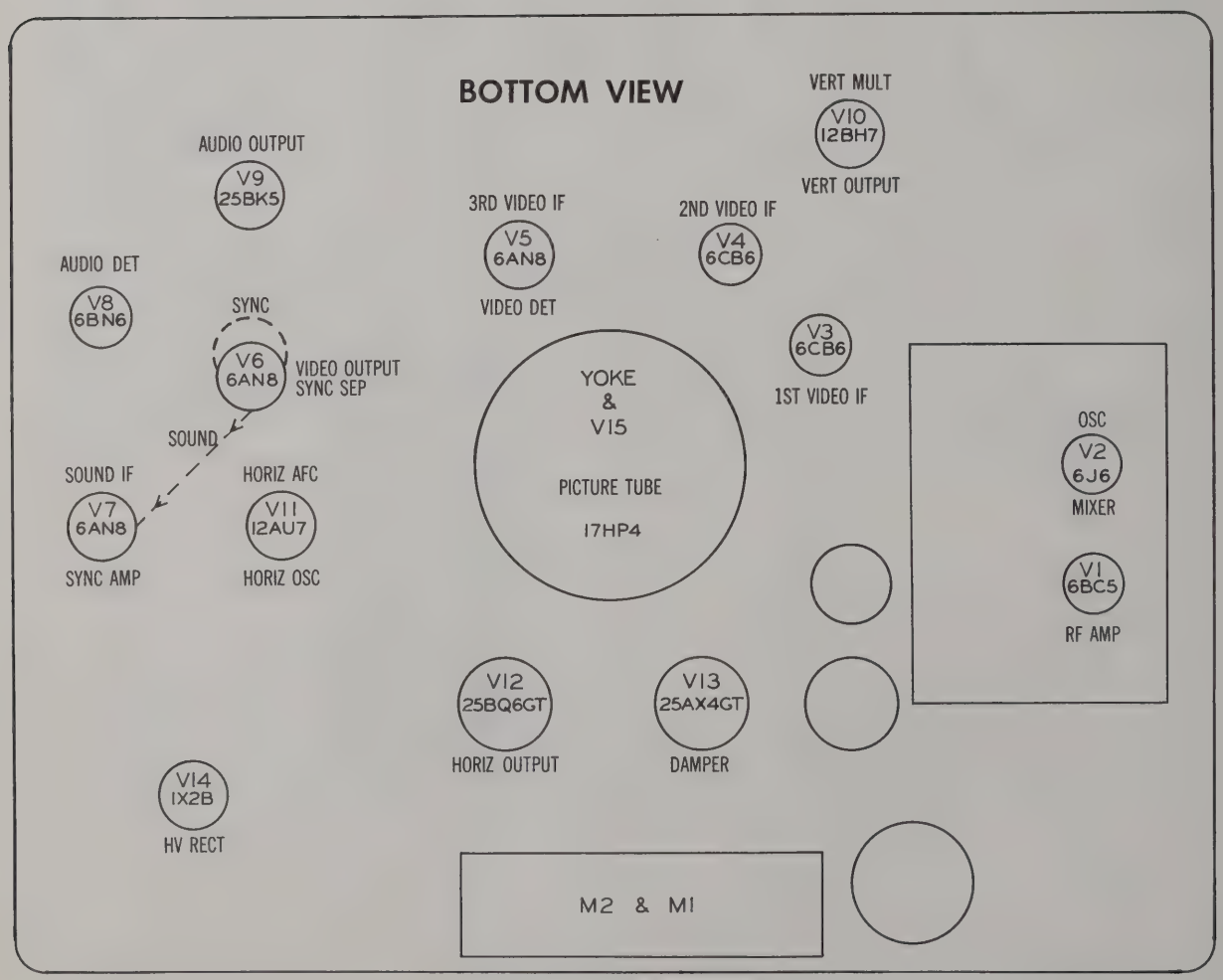


FIG. 4

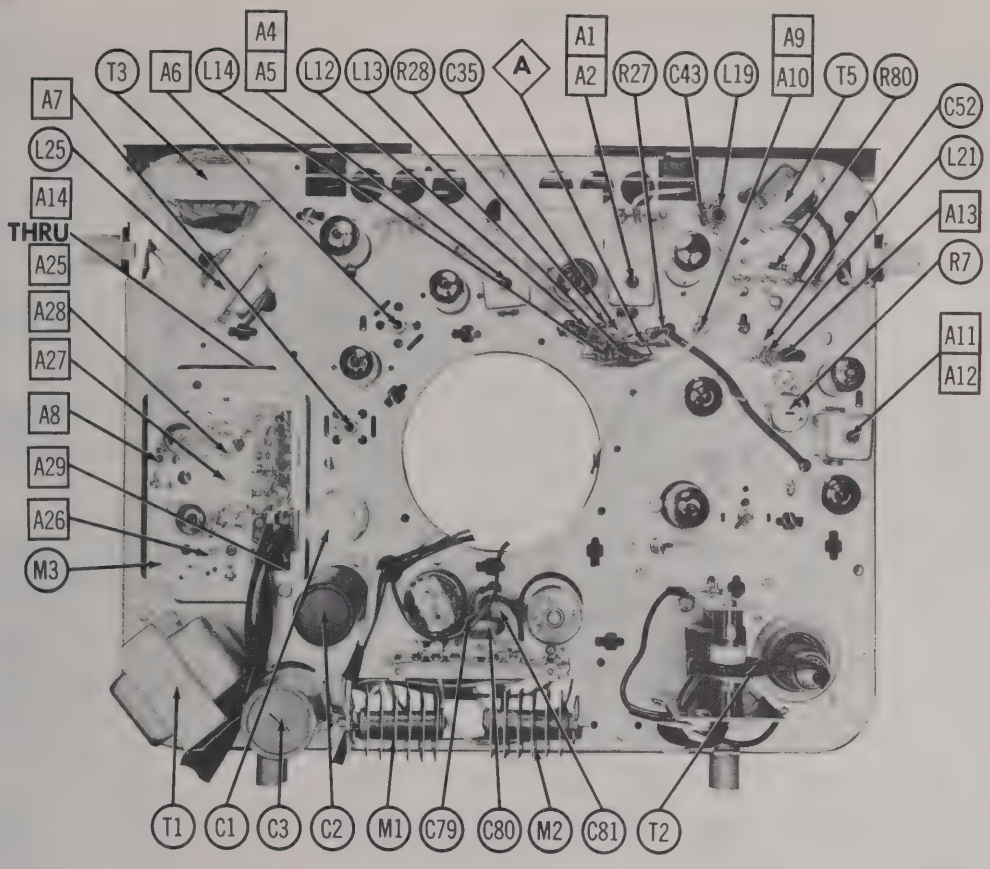
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	1Meg	0Ω	0Ω	. 1Ω	† 2. 5KΩ	† 4. 7KΩ	0Ω		
V 2	6J6	† 13KΩ	† 18KΩ	0Ω	. 1Ω	220KΩ	10KΩ	0Ω		
V 3	6CB6	1Meg	47Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 4	6CB6	1Meg	62Ω	0Ω	. 1Ω	† 3. 7KΩ	† 3. 7KΩ	0Ω		
V 5	6AN8	4. 7KΩ	4. 7KΩ	.3Ω	. 1Ω	0Ω	† 3. 5KΩ	† 3. 5KΩ	2. 6Ω	82Ω
V 6	6AN8	† 70KΩ	2. 2Meg	0Ω	0Ω	. 1Ω	† 5. 6KΩ	† 2. 5KΩ	1Meg	160Ω
V 7	6AN8	† 8. 2KΩ	22KΩ	0Ω	0Ω	. 1Ω	† 33KΩ	† 33KΩ	470KΩ	47Ω
V 8	6BN6	300Ω	. 3Ω	0Ω	. 1Ω	† 18KΩ	5. 2Ω	† 220KΩ		
V 9	25BK5	† 420Ω	TP	70KΩ	♦ 11Ω	♦ 0Ω	150Ω	70KΩ	† 38Ω	TP
V 10	12BH7	▲ 4KΩ	2. 2Meg	1. 1KΩ	. 1Ω	. 1Ω	▲ 4. 5Meg	100KΩ	100KΩ	2. 5Ω
V 11	12AU7	† 50KΩ	320KΩ	0Ω	0Ω	0Ω	† 35KΩ	1. 5Meg	300KΩ	. 1Ω
V 12	25BQ6GT	TP	♦ 20Ω	TP	† 8. 2KΩ	470KΩ	TP	♦ 11Ω	0Ω	TOP CAP ▲ 13Ω
V 13	25AX4GT	TP	NC	200KΩ	NC	† 38Ω	TP	♦ 20Ω	♦ 27Ω	
V 14	1X2B		PINS	1 - 9	HAVE	INF	RESISTANCE			TOP CAP ▲ 253Ω
V 15	17HP4	0Ω	33KΩ	PIN 6 † 38Ω	PIN 10 † 38Ω	PIN 11 † 200KΩ	PIN 12 . 1Ω			

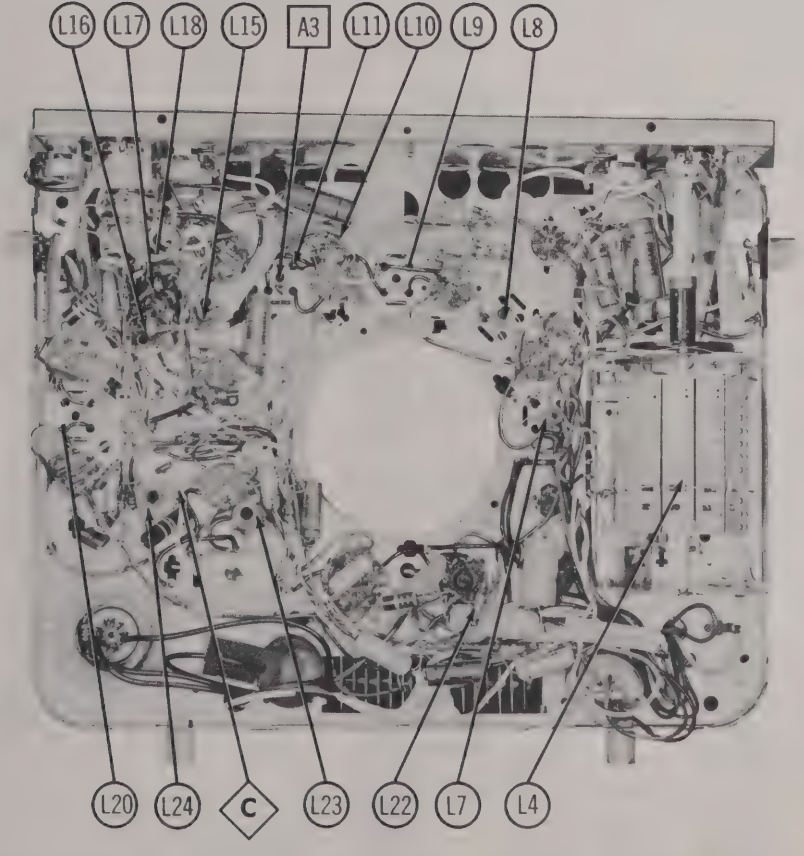
† MEASURED FROM OUTPUT OF M2.
▲ MEASURED FROM PIN 3 OF V13.
TP-TIE POINT.
NC-NO CONNECTION.
♦ MEASURED FROM PIN 5 OF V9.



TUBE PLACEMENT CHART



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BC8	6BC8	
V2	Mixer-Oscillator	6J8	6J8	
V3	1st. Video IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier-Video Detector	6AN8	6AN8	
V6	Video Output-Sync Sep.	6AN8	6AN8	
V7	Sound IF-Sync Amplifier	6AN8	6AN8	
V8	Audio Detector	6BN6	6BN6	
V9	Audio Output	25BK8	25BK8	
V10	Vert. Mult.-Vert. Output	12BH7	12BH7	
V11	Horiz. AFC-Horiz.Osc.	12AU7	12AU7	
V12	Horiz. Output	25BQ8GT	25BQ8GT	
V13	Damper	25AX4GT	25AX4GT	
V14	HV Rectifier	1X2B	1X2B	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: FIRESTONE PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V15	17BP4	17BP4/ 17RP4 17HP4AB ①	17HP4/17RP4 17HP4B ①	17HP4/ 17RP4 17HP4B ①	① Aluminized ② Silver screen "SS"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP	VOLT	REPLACEMENT DATA: FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	150	150	8C-22464	AFBBI-70	XA004	FP147	TM-150-150	T-050	TVL-3442
C2	150	150	8C-22463	AFBBI-70	XA004	FP147	TM-150-150	T-050	TVL-3442
C3A	100	300	8C-25309	RE-1019	D102	WQ635	TM-4128	T-630	R-2194
B	10	300			BR505			MT-0550	
C	25	450							
D	50	50							
C4	5	300	8C-34474	PBR335V4	BR433	TC90	TD-8-350	FM-3508	TVA-1801

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C5	1.5		13L8C1R5C	NPO-1R5.5	TCZ-1R5	Z004	NP0A-1R5	ZT-5515	5TCCB-Y15	
C6	6.8		13L8C6R8J	NPO-D16.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-Y68	
C7	6.8		13L8C6R8J	NPO-D16.8	TCZ-6R8	Z013	NP0A-6R8	ZT-5568	5TCCB-Y68	
C8	3-10		31B-903		839-3					
C9	800		13M-320EA-1032C							
C10	.5-3		31B-903		839-3		31S5-01-0R5	CT565A		
C11	800		13M-320EA-1032C							
C12	800		13M-320EA-1032C							
C13	.5-3		31B-903		839-3		31S5-01-0R5	CT565A		
C14	80		13M-520Q-500J							
C15	10		13LSQ10AA							
C16	10		13L8U100D							
C17	2.2		13L8C8R2D	NPO-D18.3		Z038	NP0A-8R2			
C18	150		13L8Y1R5K	BPD-00013	DD-1R1	G044	511-131	UC-5313	5GA-T12	
C19	800		13M-330EA-1032C							
C20	2.2			NPO-S13.2	TCZ-2R2	T205	NP0A-2R2		5TCCB-Y22	
C21	15			NPO-S115	TCZ-15	T21	NP0E-150		5TCC-Q15	
C22	1000			BPD-001	DD-102	K069	501-001	DC-521	5HK-D1	
C23	3000			SI2000	D6-302	TP56	GP21-102	UC-522	5HK-D2	
C24	1000			BPD-001	DD-102	K069	501-001	DC-521	5HK-D1	
C25	5			NPO-S15	TCZ-4R7	T207	NP0A-050	DC-555	5TCCB-V47	
C26	47			BPD-000047	DD-470	G023	511-470	UC-5447	5GA-Q47	
C27	1000			BPD-001	DD-102	K069	501-001	DC-521	5HK-D1	
C28	680			SI680	D6-681	TP50	GP2K-681	UC-5368	5GA-T68	
C29	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	
C30	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	
C31	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	
C32	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	
C33	1000			BPD-001	DD-102	K069	501-001	DC-521	5HK-D1	
C34	5			NPO-S15	TCZ-4R7	T207	NP0A-050	DC-555	5TCCB-V47	
C35	5			NPO-S15	TCZ-4R7	T207	NP0A-050	DC-555	5TCCB-V47	
C36	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	
C37	.22	300		P2S3K-S3		D12BP22		PT4023	2TM-P23	
C38	.1	300		P2S3K-1	DF-104	CUBSP1		PT401	2TM-P1	
C39	91									
C40	3.3			NPO-S13.3	TCZ-3R3	T206	NP0A-3R3	ST-5533	5TCCB-V33	
C41	33			NPO-S133	TCZ-33	T218	NP0L-330	ST-5433	5TCC-Q33	
C42	.1	400		P4S8-1	DF-104	CUP4P1		PT401	4TM-P1	
C43	100			1469-0001	D6-101	SW5T1	511-101	MC5235	MS-31	
C44	.022	200		BPD-02	D6-203	CUBS223	517-02	PT4123	2TM-S23	
C45	.022	600		BPD-02	DD-303	CUBS223	517-02	PT6123	6TM-S23	
C46	30		16B-33772							Note 2
C47	10000			BPD-01	DD-103	K082	511-01	DC-511	5HK-E1	
C48	1000			SI1000	D6-102	TP52	GP2L-102	UC-521	5HK-D1	Note 1
C49	470			1469-00047	D6-471	SR2T47	511-471	MC5248	MS-347	
C50	10000			BPD-01	DD-103	K082	511-01	DC-511	5HK-E1	
C51	10000			BPD-01	DD-103	K082	511-01	DC-511	5HK-E1	
C52	10			NPO-S110	TCZ-10	T209	NP0A-100	ST-5541	5TCC-Q10	
C53	1000			BPD-001	DD-102	K069	501-001	DC-521	5HK-D1	
C54	.01	400		BPD-01	D6-103	CUP4E1	GP3-333-103	PT411	4TM-E1	
C55	.01	600		BPD-01	D6-103	CUBS31	GP3-333-103	PT611	6TM-E1	
C56A	270			SI270		TP41	GP2K-271	UC-5327	5GA-T27	
B	10000		①17A-34313	BPD-01	①PC-203	K082	511-01	DC-511	5HK-E1	
C	25			SI25		TP25	GP2K-250	UC-5425	5GA-Q25	
C57	.047	200		BPD-05	DF-503	CUBS347		PT4147	2TM-S47	
C58A	2000							DC-525		
B	5000		①17A-32276	①PA-110	①PC-100	①MST341	①4605-01	DC-525	①Y-1	
C	5000							DC-525		
C59	2000			SI2000	D6-302	TP56	GP2-333-302	UC-525	5HK-D2	
C60	.1	200		P2S3K-1	DF-104	CUBSP1		PT401	2TM-P1	
C61	.022	400		BPD-03	DF-303	CUBS233		PT4133	4TM-S23	
C62	.1	300		P2S3K-1	DF-104	CUBSP1		PT401	2TM-P1	
C63	.1	400		P4S8K-1	DF-104	CUP4P1		PT401	4TM-P1	
C64	1000	3000	9C-34491	SVD1-30-001	DD30-102	VZD1	31KV-102	DC3081	3DGA-D1	
C65	82			1469-000062	D6-820	SR5Q82	501-820		MS-482	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C66	82			1469-000082	D6-820	SR5Q82	501-820		MS-482	
C67	.047	200		BPD-05	DF-503	CUBS347		PT4147	2TM-S47	
C68	.022	200		BPD-02	DD-303	CUBS223	517-02	PT4122	2TM-S22	
C69	.47	200		P2S8-47		CUBSP47		PT4047	2TM-P47	
C70	.047	400		BPD-05	DF-503	CUBS347		PT4147	4TM-S47	
C71	270			1469-00027	D6-271	5W5T27	511-271	MC3241	MS-327	
C72	.01	600								
C73	1000			1484-001		1R5D1	511-102	MC3255	MS-31	
C74	82			1469-000062	D6-820	SR5Q82	501-820		MS-482	
C75	.001	600		SI1000	D6-102	CUBSD1	GP5L-103	PT521	6TM-D1	
C76	.047	400		BPD-05	DF-503	CUBS4547		PT4147	4TM-S47	
C77	.1	600		P6S8K-1	DF-104	CUP6P1		PT601	6TM-P1	
C78	.15	200		P2S8K-15		CUP2P15		PT4015	2TM-P15	
C79	330	4000	8G-23953	HVD-60-33	DD60-121	V5T33	5KV-331	DC30332	50GA-T33	
C80	47	3000	8G-24023	HVD-30-47	DD30-471	V3Q47	3KV-470	DC30447	30GA-B-Q47	
C81	47	2000	8G-23645	HVD-20-47	DD30-470	V2Q47	2KV-470	DC30447	20GA-Q47	
C82	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	
C83	5000			BPD-2X0005	DD5-503	DK079	‖ 511-005 ‖ DC-525		5HK-2D47	
R	5000						511-005	DC-525		
C84	5000			BPD-005	DD-502	K080	511-005	DC-525	5HK-D5	

Note 1. Not used in some versions.
Note 2. C48 is the capacity of the sound IF coupling shielded lead.
† Items C56A, C56B, C56C, R43A and R43B are combined in one unit.
* Items C58A, C58B, C58C, R50A, R50B and R50C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESIST-ANCE	WATTS	REPLACEMENT DATA: FIRESTONE PART No.	CENTRALAB PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1000Ω	½	B10A-23714	F1-4	RTV-486	*QJ-734	UF13L (Panel)
B	1Meg	½		S2-52			UR16A) † Volume (Rear)
C	Switch			K2-1			UR-28) Attach to R1B.
R2A	50kΩ	½	B10B-23694	AB-51	A47-50K-S	QJ1-123	Horiz. Hold
B	Shaft		Not Req.	AK-19	FKS-½	TQ	Not Req. Attach to R2A.
R3A	500kΩ	½	B10B-23695	AB-59	A47-500K-S	QJ1-133	TA5EL Brightness
B	Shaft		Not Req.	AK-4	EKS-3	Not Req.	Not Req. Attach to R3A.
R4A	150kΩ	½	B10B-23693-1	AB-43	A47-150K-S	QJ1-128	TA19L Vert. Hold
B	Shaft		Not Req.	AK-4	EKS-3	Not Req.	Not Req. Attach to R4A.
R5A	6000Ω	½	B10B-23407	* AB-10	* A47-5000-S	* QJ1-114	* TA53L Vert. Linearity
B	with 1000Ω Stop						
B	Shaft		Not Req.	AK-1	FKS-¼	RQ	Not Req. Attach to R5A.
R6A	3Meg	½	B10B-23696	AB-84	A47-3Meg-S	QJ1-140	TA36L Vert. Size
B	Shaft		Not Req.	AK-1	FKS-¼	RQ	Not Req. Attach to R6A.
R7	7500	2	A10D-23857		39-800		Buss

* Connect a 1000Ω resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).
* Concentrikit Equivalent; K-8 Kit, Base Elements and Shafts; B17-108 & P17-102 (Panel) B13-137 & R2-115 (Resr) 76-1) (Switch)
† Universal Replacement (Mallory Exact Duplicate Part No. UE656).

RESISTORS

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R8	68kΩ	½		BTS-680K	
R9	4700Ω	½		BTS-4700	
R10	2200Ω	½		BTS-2200	
R11	220kΩ	½		BTS-220K	
R12	15kΩ	½		BTS-15K	
R13	10kΩ	½		BTS-10K	
R14	10kΩ	½		BTS-10K	
R15	5600Ω	½			
R16	1000Ω	½		BTS-1000	
R17	1000Ω	½		BTS-1000	
R18	47Ω	½		BTS-47	
R19	18kΩ	½			
R20	1000Ω	½		BTS-1000	
R21	1000Ω	½		BTS-1000	
R22	620 5%	½		BTS-62 5%	
R23	270Ω	½	9C11-1104		
R24	33kΩ	½			
R25	1000Ω	½		BTS-1000	
R26	82Ω	½		BTS-82	
R27	1Meg	½		BTS-1Meg	
R28	4700Ω	½		BTS-4700	
R29	1Meg	½		BTS-1Meg	
R30	5600Ω	2		BTS-5600	
R31	47Ω	½		BTS-47	
R32	100kΩ	½		BTS-100K	
R33	33kΩ	½		BTS-33K	
R34	470K Ω	½		BTS-470K	Note 1
R35	47kΩ	½		BTA-33K	
R36	47Ω	½		BTS-47	
R37	680Ω	½		BTS-680	
R38	220KΩ	½		BTS-220K	
R39	18kΩ	2		BTS-18K	
R40	22kΩ	½		BTS-22K	Note 3
R41	180Ω	½		BTS-180	
R42	10kΩ	½		BTS-10K	
R43A	220kΩ	½	† 17A-34313	BTS-220K	
B	2.2Meg	½		BTS-2.2Meg	
R44	100kΩ	½		BTS-100K	
R45	560kΩ	½		BTS-560K	

ITEM No.	RATING: OHMS	WATT	REPLACEMENT DATA: FIRESTONE PART No.	IRC PART No.	NOTES
R46	22kΩ	½		BTS-22K	
R47	1Meg	½		BTS-1Meg	
R48	4700Ω	½		BTA-4700	
R49	1000Ω	½		BTS-1000	
R50A	22kΩ	½		BTS-22K	
B	2200Ω	½	* 17A-22376	BTS-2200	
C	6300Ω	½		BTS-6300	
R51	100kΩ	½		BTS-100K	Note 3
R52	4700Ω	½		BTS-4700	
R53	68kΩ	½		BTS-68K	Note 4
R54	2.2Meg	½		BTS-2.2Meg	
R55	100kΩ	½		BTS-100K	
R56	3.3Meg	½		BTS-3.3Meg	
R57	3300Ω	5	9C12-1105	PWT-3300	
R58	560Ω	½			
R59	560Ω	½			
R60	330kΩ	½			
R61	820kΩ	½		BTS-820K	
R62	2200Ω	½			
R63	68kΩ	½			
R64	3900Ω	½			
R65	39kΩ	½			
R66	18kΩ	½			
R67	100kΩ	½		BTS-100K	
R68	68kΩ	½			
R69	82kΩ	½			
R70	470K	½		BTS-68K	
R71	47kΩ	½		BTA-47K	
R72	4700Ω	½		BTS-4700	
R73	100Ω	½			
R74	470kΩ	½			
R75	2200Ω	2			
R76	1.5Ω	5		BW1-1.5	
R77	2200Ω	5	9C-34023	PWT-2200	
R78	13Ω	15	9C-33972		
R79	9Ω	5	9GM-33018		
R80	470KΩ	½		BTS-470K	Note 5
R81	330KΩ	½		BTS-330K	
R82	470KΩ	½		BTS-470K	

Note 1. Some versions use a 100KΩ ½W resistor in this application.
Note 2. Some versions use a 47Ω ½W resistor in this application.
Note 3. Some versions use a 47KΩ ½W resistor in this application.
Note 4. Some versions use a 82KΩ ½W resistor in this application.
Note 5. Not used in some versions.
† Items R43A, R43B, C56A, C56B, C56C are combined in one unit.
* Items R50A, R50B, R50C, C58A, C58B, C58C are combined in one unit.

TRANSFORMER (FILAMENT)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	115VAC @.90A	12VCT @.6.1A			12DS5698-3	P5S38 ①	P2S60	P6130	21F67	

① Drill new mounting holes.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	RCA TYPE No	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T2	Horiz. Output Trans.	12E-23939	P3457 *	HVO-58 *	X126 *			FLY-80 *	D-70 *
T3	Vert. Output Trans.	12E-23726-1	21804	A-3037	222T1	A-3123	P6053		A-102X
T4A	Yoke Horiz. (5.5MH)	20L-25566 ↓	DF601 ↓	MDF-70	20601 ↓	Y70F05	DY-6A ↓	Y-6 ↓	Y-12-1 ↓
B	Vert. (44MH)	16M-24493 ②	②	②	②	②	②	②	②

① Includes resistors R59, R59.
② Yoke rear cover and centering device.
③ Use original horizontal yoke damping network.
* Requires new centering device.
↓ Loosen and rotate core clamp to duplicate original mounting.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
8	8	8		8		8	8
6	6	5		6		6	5
3	3	3		3		3	3
2	2	2		2		2	2

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T5	6.4KΩ	3-4Ω	12C23704	21113	A3026	A3878	24S60	S-7X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: FIRESTONE PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	4"	PM	3-4Ω	18A2458	4A07	22361	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	REPLACEMENT DATA: FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Matching Trans.	0Ω	0Ω	1056-35235				
L2	Ant. Matching Trans.	0Ω	0Ω	1056-35235				
L3	IF Trap			1056-35231				
L4A	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35258-3				Channel 2
B	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35258-3				Channel 3
C	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35258-4				Channel 4
D	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35258-5				Channel 5
E	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35258-6				Channel 6
F	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-7				Channel 7
G	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-8				Channel 8
H	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-9				Channel 9
I	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-10				Channel 10
J	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-11				Channel 11
K	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-13				Channel 13
L	Ant., RF, Mixer Grid, Osc. Coils	0Ω		1056-35260-13				Channel 13
L5	RF Coil	0Ω		1056-25237				
L6	1st Video IF	.9Ω		1056-25238				
L7	28.25MC Trap	.1Ω		1SM-25696				
L8	2nd Video IF	.8Ω		20L-25239				
L9	3rd Video IF			20L-24043				Includes resistors & caps.
L10	RF Choke	3.6Ω		20L-32265	19-3036	TV-180	6175	35.3 Microhenries
L11	4th Video IF	.1Ω	.2Ω	13B-23887				
L12	Series Peaking Coil	5.6Ω		18A-23923	19-6022		6182	23 Microhenries
L13	Series Peaking Coil	2.6Ω		18A-23923	19-6022		6182	23 Microhenries
L14	Shunt Peaking Coil	22Ω		18A-18295	19-4600		6174	430 Microhenries
L15A	4.5MC Trap	1.8Ω		20L-25729				
B	1st Sound IF	2.1Ω						
L16	Series Peaking Coil	5.7Ω		18A-31201	19-3300		6183	305 Microhenries
L17	Shunt Peaking Coil	7.6Ω		18A-30970	19-3360	TV-185	6180	270 Microhenries
L18	Series Peaking Coil	5.6Ω		18A-34090	19-3005		6622	11 Microhenries

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L19	4.5MC Trap	1Ω		201-24749	20-1004	TV-151	1469	
L20	2nd Sound IF	.3Ω	.3Ω	201-23873	17-3495 *	TV-113 *	6203 *	
L21	Quadrature Coil	5.2Ω		201-23727	20-1005		1480	
L22	RF Choke	1.6Ω						8 Microhenries

* Cut out chassis hole and use adaptor plate.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA							NOTES
	PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	
L23	80Ω		12E-24440			6212				Tapped ② 58Ω Horiz. Osc.
L24	38Ω		13M-24441			6314				Horiz. Phase

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	FIRESTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L25	.250A	37.5Ω	.5HY	16A-23889-1	C5040	C2994	C2327	26C41	C-23X ①

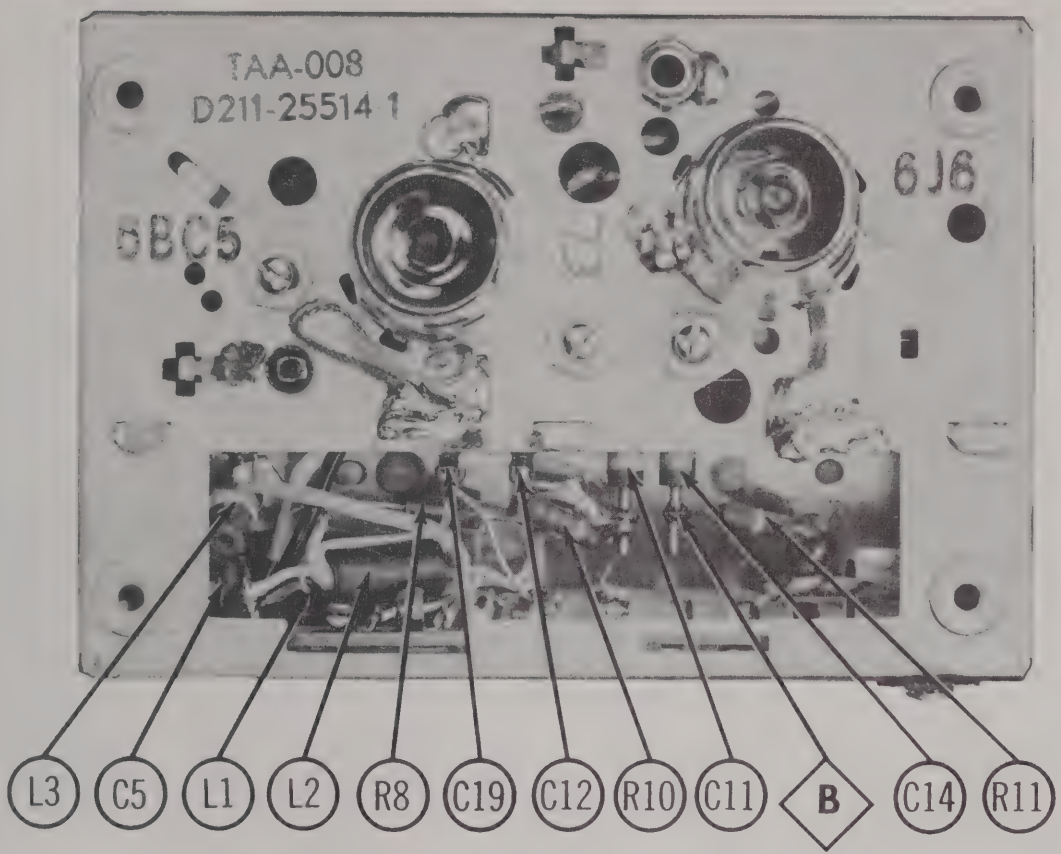
① Drill one new mounting hole.

SELENIUM RECTIFIER

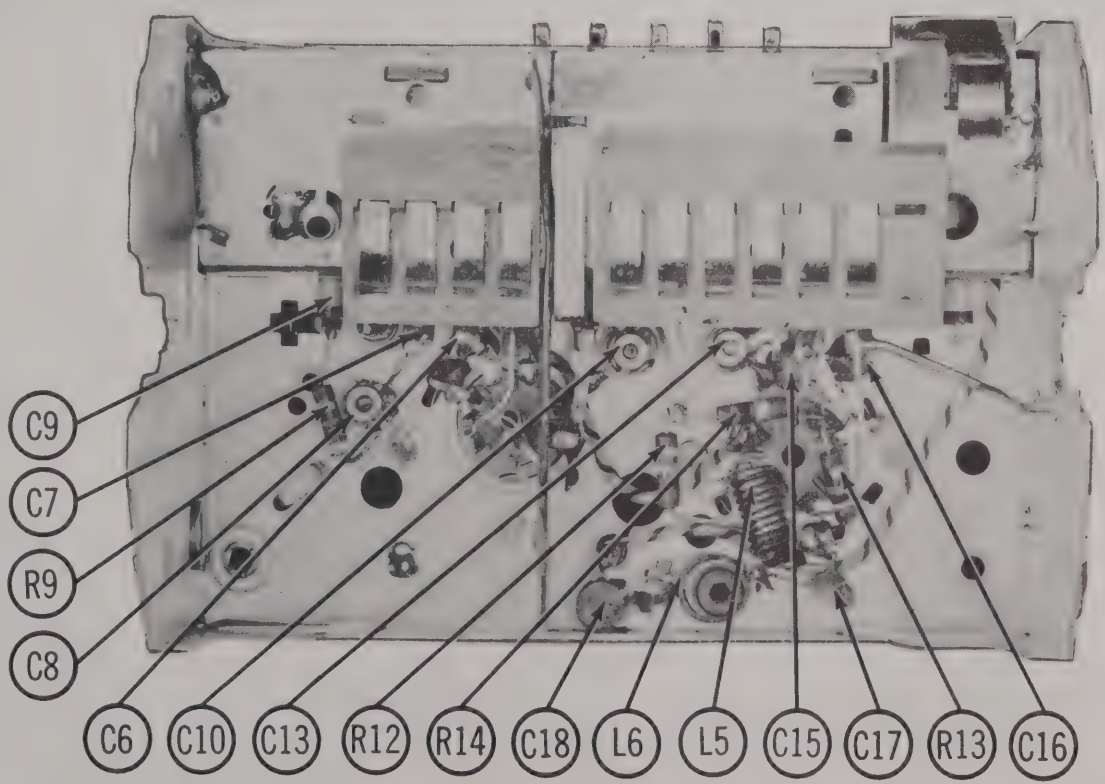
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	FIRESTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.250A	21J23840	1236A	MR300	6S300	6Q4	250	
M2	.250A	21J23840	1236A	MR300	6S300	6Q4	250	

MISCELLANEOUS

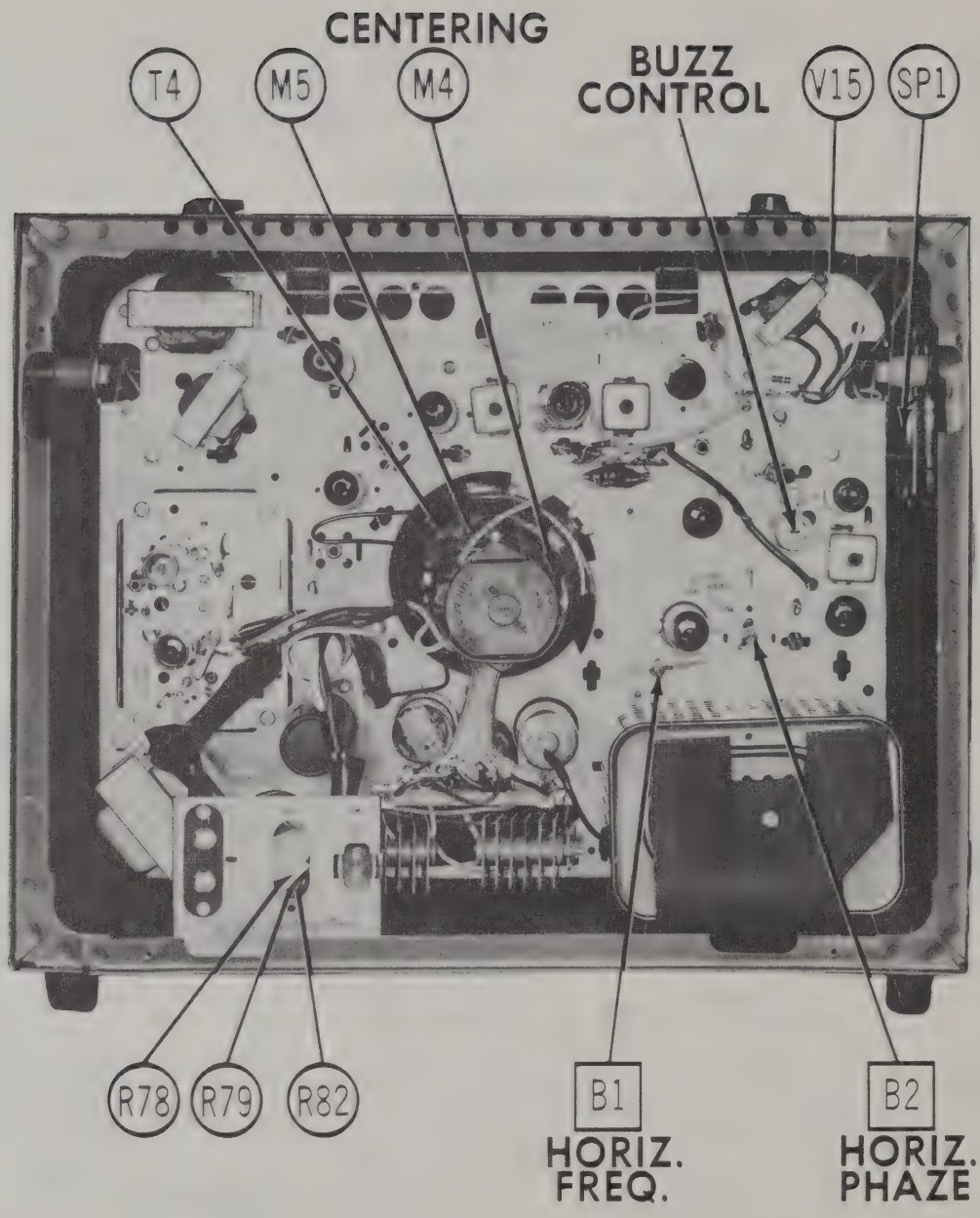
ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M3	Tuner	211-25514-1	VHF
M4	Centering Device	16M-24493	Includes Deflection Yoke (T4) Rear Cover
M5	Ion Trap	16M-19705	
	Cabinet	200-25557	Model 13-G-186
	Cabinet	R2B-25280-A147	Model 13-G-165 (Specify Color)
	Knob	5B-23806-A29	Channel Selector-Model 13-G-186
	Knob	5B-23807-A29	Fine Tuning-Model 13-G-186
	Knob	5B-23808-A29	Picture-Model 13-G-186
	Knob	5B-23809-A29	On-off-volume-Model 13-G-186
	Knob	5B-23839-A29	Control (3 used)-Model 13-G-186
	Knob	B5B-23839-A93	Control-(3 used)-Model 13-G-165
	Knob	B5B-23809-A93	On-off-volume-Model 13-G-165
	Knob	B5B-23808-A93	Picture-Model 13-G-165
	Knob	B5B-23807-A93	Fine Tuning-Model 13-G-165
	Knob	B5B-23806-A93	Channel Selector-Model 13-G-165
	Safety Glass	30M-25276	



RF TUNER-TOP VIEW



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern.

Turn the horizontal hold control (R2) to its mid-range position.

Connect a short clip lead across L24. Adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. Remove the clip lead from L24. Connect the vertical lead of the oscilloscope thru a low capacity probe to point Ⓒ. Low side to chassis. Adjust the horizontal stabilizer coil (B2) until a waveform similar to Fig. 5 is obtained. While making this adjustment, keep the picture in sync with the horizontal hold control. Check the range of the horizontal hold control (R2). Turn R2 fully counter clockwise, then back clockwise. The picture should fall out of sync at each extreme setting of the control.

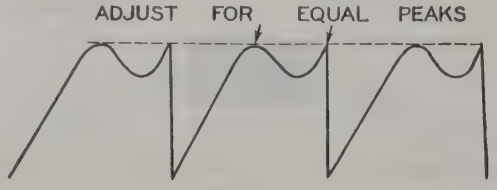


FIG. 5

PHOTOFACT* Folder

*TRADE MARK

RETMA MEMBER

IMPORTANT FILING NOTICE

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Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.

MAGNAVOX CHASSIS CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA

MAGNAVOX CHASSIS CTA473AA

TRADE NAME	Magnavox Chassis CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA
MANUFACTURER	Magnavox Co., 2131 Bueter Road, Fort Wayne 4, Indiana
TYPE SET	Television Receiver
TUBES	Twenty
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.7 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

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CHASSIS

CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push-on type control knobs from front panel of cabinet.

2. Remove 7 wood screws and 1 metal screw. Remove rear cover.

3. Disconnect speaker leads.

4. Remove 3 bolts from 3 braces (one at top center and 1 on each side).

5. Remove 6 mounting board bolts. Hold mounting board in place and let drop in slide, to remove slide out.

6. Remove 8 speaker nuts. Remove 2 speakers.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove 4 wood screws holding metal strip at the top edge of the safety glass. Remove strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control to its mid-range position and adjust the horizontal frequency slug (L32) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the discriminator secondary (L31) located on top of chassis.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

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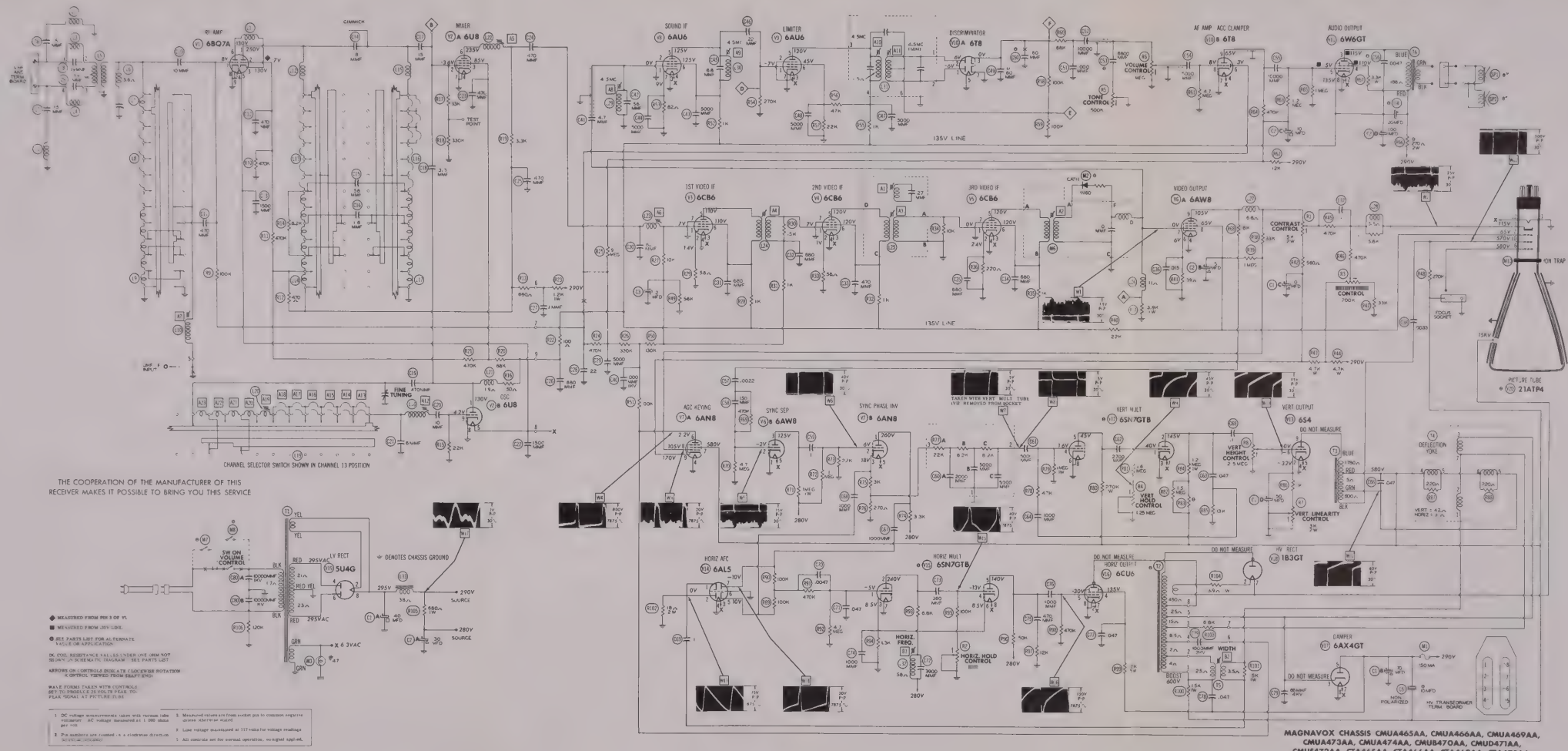
DATE 5-56 SET 317 FOLDER 7


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
135V LINE
SW ON VOLUME CONTROL
DENOTES CHASSIS GROUND
MEASURED FROM PIN 3 OF V1.
MEASURED FROM -35V LINE.
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION.
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. SEE PARTS LIST.
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION OF CONTROL VIEWED FROM SHAFT END.
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 25 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.
DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
Pin numbers are counted in a clockwise direction looking at socket.
Measured values are from socket pin to common negative point unless otherwise noted.
Line voltage maintained at 117 volts for voltage readings.
All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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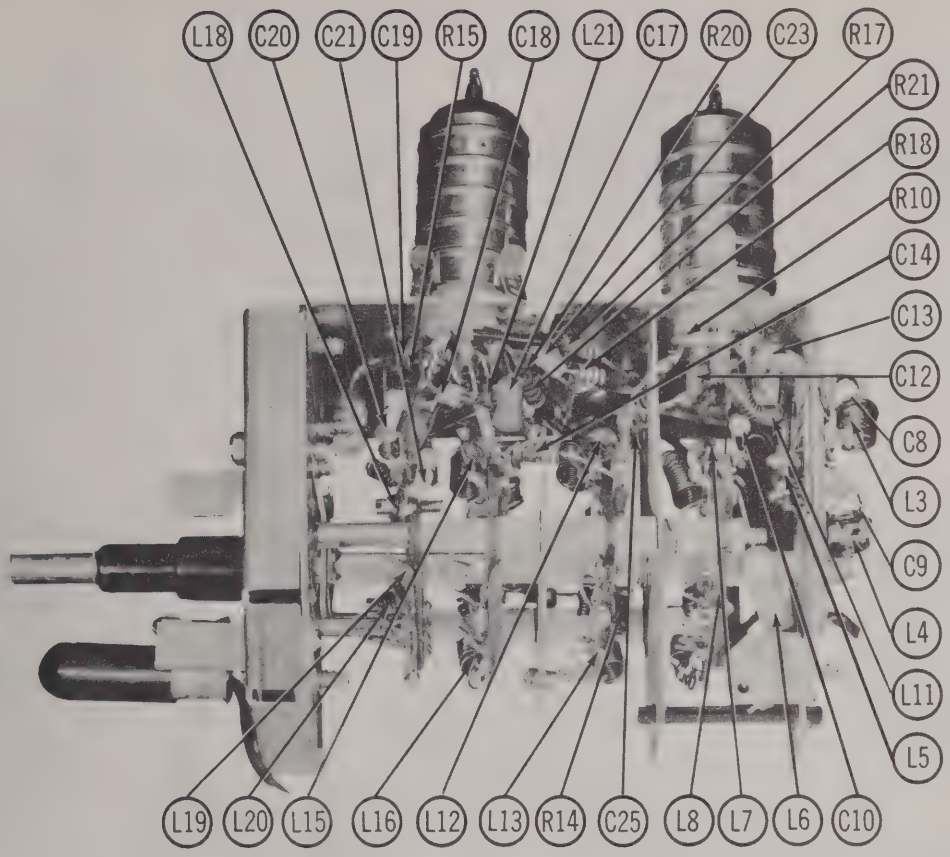
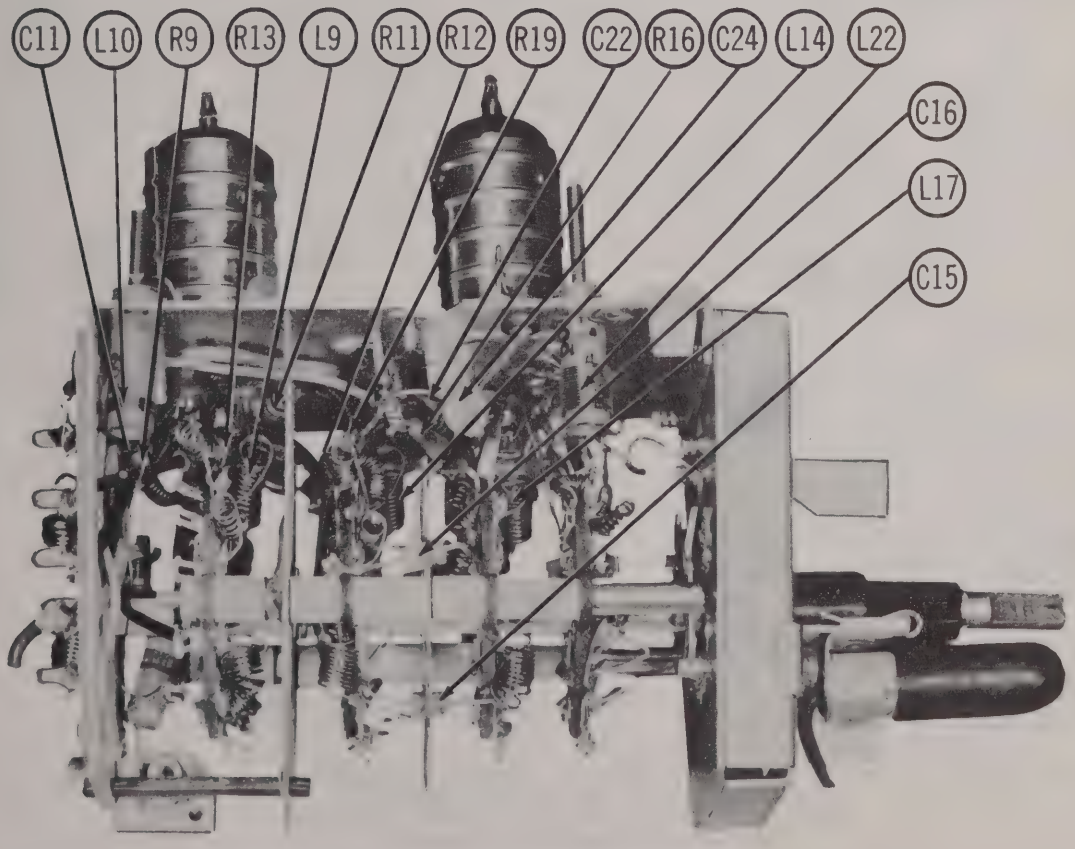
MAGNAVOX CHASSIS CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA

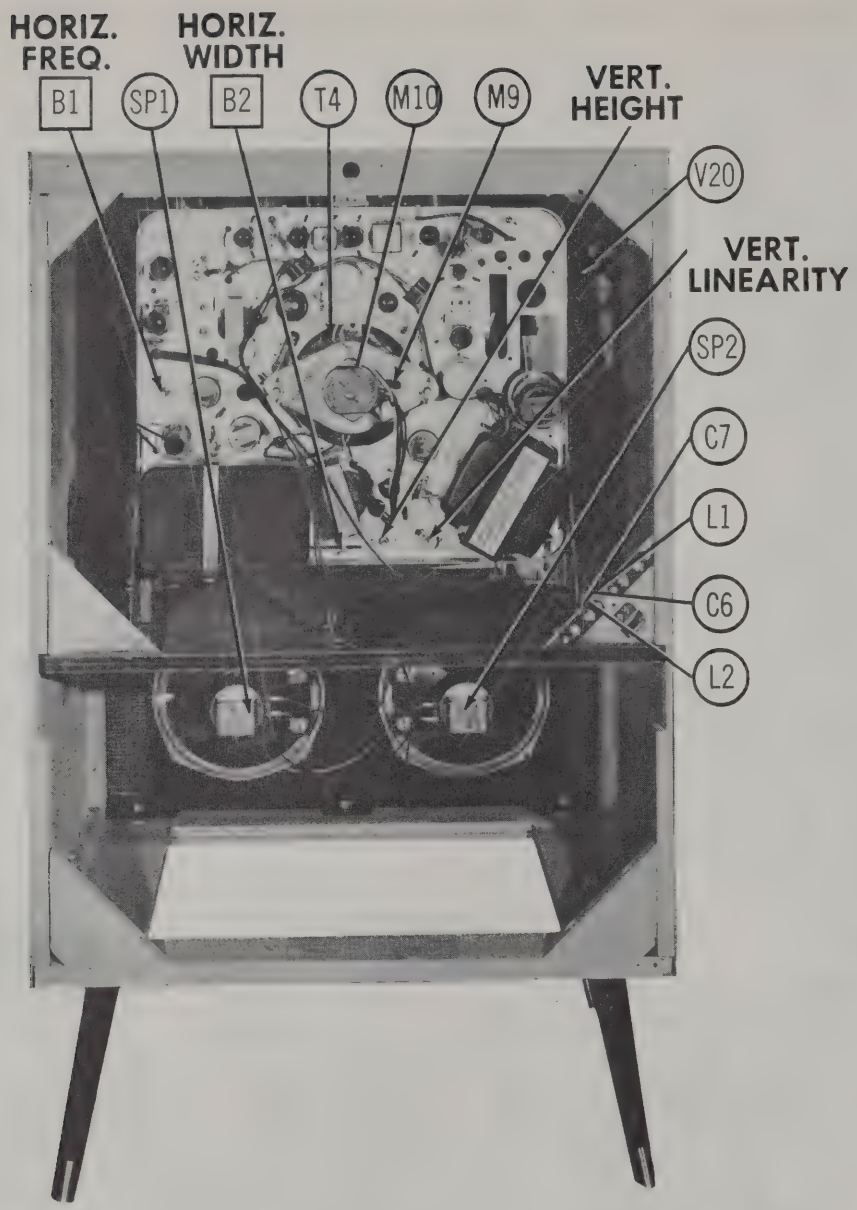
MAGNAVOX CHASSIS CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

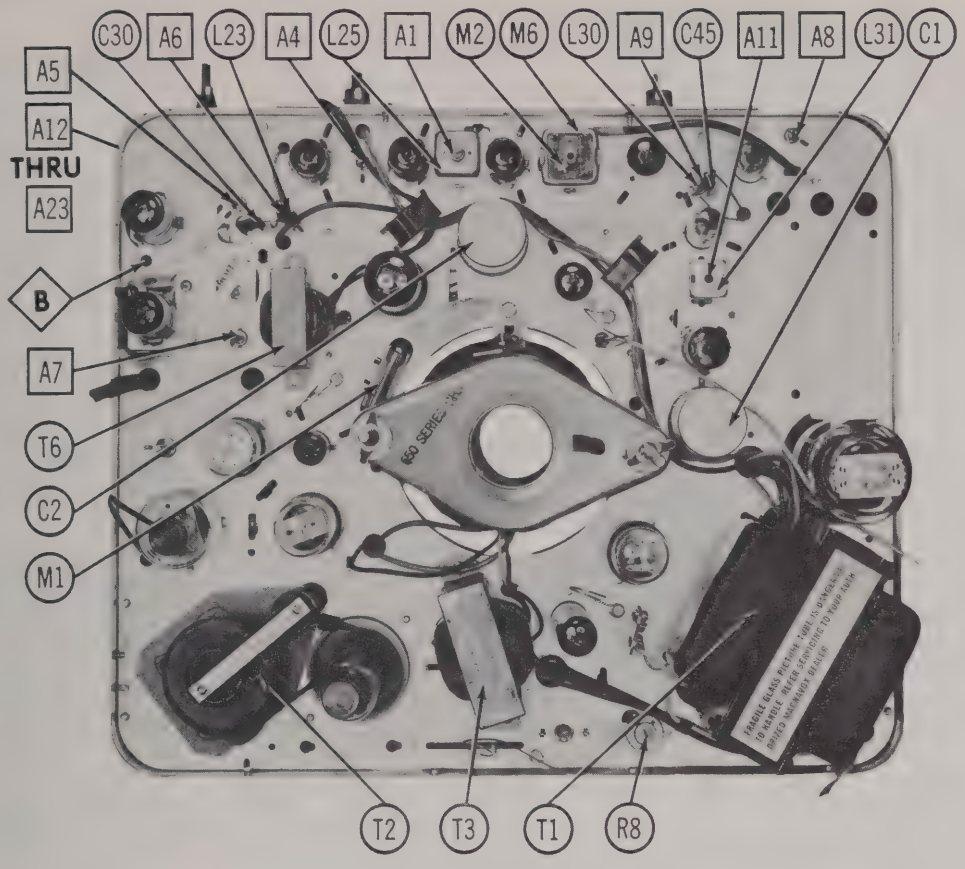
Turn the set on and tune in a TV station, preferably with a test pattern.

Set the horizontal hold control to its mid-range position. Turn the horizontal frequency slug (B1) slowly clockwise while switching on and off channel until picture just loses sync. Turn B1 counter clockwise until picture just pulls into sync, then turn B1 an additional half turn counter clockwise.

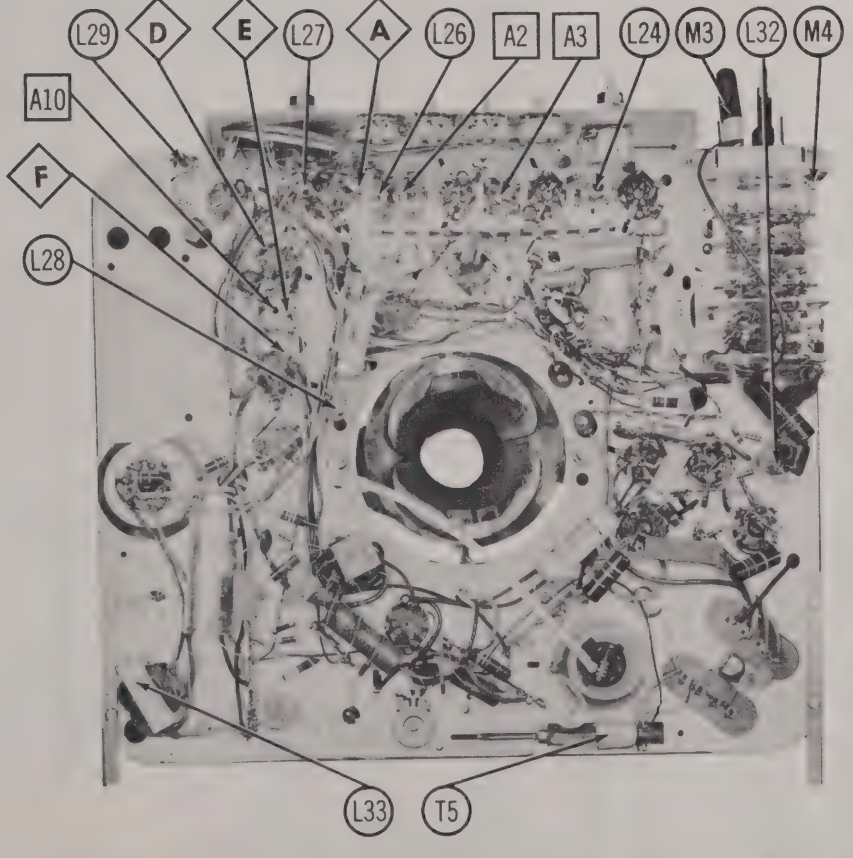
The picture should hold sync at both extreme ends of the horizontal hold control.

If necessary, readjust B1 slightly and test for sync and pull-in as above.

Adjust the width slug (B2) for a picture slightly wider than is necessary to fill the picture mask horizontally.



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BQ7A	6BQ7A	
V2	Mixer-Oscillator	6U8	6U8	
V3	Int. Video IF Amplifier	6CB6	6CB6	
V4	Int. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Output-Sync Sep.	6AW8	6AW8	
V7	AGC Keying- Sync Phase Inverter	6AN8	6AN8	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Limiter	6AU6	6AU6	
V10	Discriminator-AF Amp.-AGC Clamper	6T8	6T8	
V11	Audio Output	6W6GT	6W6GT	
V12	Vert. Mult.	6SN7GTB	6SN7GTA	6SN7GTA may be used as an alternate
V13	Vert. Output	6S4	6S4	
V14	Horiz. AFC	6AL5	6AL5	
V15	Horiz. Mult.	6SN7GTB	6SN7GTA	6SN7GTA may be used as an alternate
V16	Horiz. Output	6CU6	6CU6	
V17	Damper	6AX4GT	6AX4GT	
V18	HV Rectifier	1B3GT	1B3GT	
V19	LV Rectifier	5U4G	5U4G	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: MAGNAVOX PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V20	21ATP4 ①	21ATP4 ①	21ATP4 ①	21ATP4 ③	① Aluminized ② Silver screen "85"
	24TP4 ②		21ATP4A ②	24TP4 ④	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	VOLT.	MAGNAVOX PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	●40	350	270021-52		FP385	TM-504030-350	-Q-025		TVL-3782
B	●70	350			TC39	TD-50-50	MTH-0550		TVA-1506
C	●10	350							
D	10	50							
C2A	●50	350	270021-57		FP386	TM-311T	T-735		TVL-3763
B	●5	350			TC60	TD-30-350	FM-3508		TVA-1501
C	●10	350							
D	100	200							
C3	80	90	270037-33	PRS50V3	BSR2-50	TC302	TD-3-50	MMT-0505	TVA-1901
C4	20	350	270027-20 (Note 1)	PRS350V20	BR2035	TC85	TD-20-350	FM-4520	TVA-1906
C5	10	350	270027-26 (Note 2)			TC85 * TC65 *	TD-10-350NP	MT-4520 * MT-4530 *	

Note 1. Not used in chassis models with separate audio chassis.
Note 2. C5 is a non-polarized unit.
* Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	15		250307-84	SI15	D6-150	TP1I	GP1K-150	UC-5415	5GA-Q15	
C7	15		250307-84	SI15	D6-150	TP1I	GP1K-150	UC-5415	5GA-Q15	
C8	39			SI39	D3-390	TP2S	S3I-390	UC-5439	5GA-Q39	
C9	39			SI39	D3-390	TP2S	S3I-390	UC-5439	5GA-Q39	
C10	10			SI10	D6-100	TP9G	GP1K-100	UC-541	5GA-Q1	
C11	470			SD0047	D5-471	K06G	S3I-470	UC-5347	5GA-T47	
C12	470			SD0047	D5-471	K06G	S3I-470	UC-5347	5GA-T47	
C13	1500			SD0015	D5-152	K07I	S01-0015	UC-5315	5HK-D15	
C14	.18									
C15	.56									
C16	1.8									
C17	15			SI15	D6-150	TP1I	GP1K-150	UC-5415	5GA-Q15	
C18	3.3			MPG-SI3.3	D3-3R3	TZ06	MPGA-3R3	ZT-5533	5TCC-S-Y33	
C19	470			SPD-00047	DD-471	K06G	S3I-471	UC-5347	5GA-T47	
C20	20			NT50-SI20	TCN-10	TW01	NT50A-100	NT-541	5TCU-Q1	
C21	6									
C22	1500			SPD-0015	DD-152	K07I	S01-0015	UC-5315	5HK-D15	
C23	470			SPD-00047	DD-471	K06G	S3I-471	UC-5347	5GA-T47	
C24	470			SPD-00047	DD-471	K06G	S3I-471	UC-5347	5GA-T47	
C25	470			SPD-00047	DD-471	K06G	S3I-471	UC-5347	5GA-T47	
C26	680		250218-4	SPD-00068	DD-681	K06S	S3I-681	UC-5368	5GA-T68	
C27	.1	400	250211-13	P288N-1		DF-104	CU3AP1	PT401	47M-P1	
C28	.22	300	250222-15	P288N-22			CU3AF22	PT4022	47M-P23	
C29	5000		250175-25	BPD-005	DD-502	K06G	S1I-005	DC-525	5HK-D5	
C30	33		250235-338	1468-000982	TCZ-S2	5RSQ82	NP50-337-S20		MS-452	
C31	680		250218-25	SPD-00068	DD-681	K06S	S1I-681	UC-5368	5GA-T68	
C32	680		250218-6	SPD-00068	DD-681	K06S	S1I-681	UC-5368	5GA-T68	
C33	470		250218-4	SPD-00047	DD-471	K06G	S3I-471	UC-5347	5GA-T47	
C34	680		250218-4	SPD-00068	DD-681	K06S	S1I-681	UC-5368	5GA-T68	
C35	680		250218-4	SPD-00068	DD-681	K06S	S1I-681	UC-5368	5GA-T68	
C36	.015	300	250152-1	P288N-153	TCB815	K81-S15	P113S		47M-S15	
C37	.1	300	250202-13	P288N-1		DF-104	CU3EP1	PT401	47M-P1	
C38	.0033	600	250201-4	P288N-332		DF-332	CU3BD33	GP2-333-S23	PT8233	47M-D33
C39	1000	2000	250175-27	SVD-30-1000	DD30-102	V12D	5KV-102	DC3021	30GA-D1	
C40	1000	1000	250175-26	SVD-15-1000	DD-103	V01	5KV-102	DC3021	10EKB-D1	
C41	4.7		250232-153	SPD-S54.7	TZ07	TZ07	NP50A-4R7	ZT-5547	5TCC-S-V47	
C42	56			SI56	D6-560	TP3I	GP1K-560	UC-5456	5GA-Q56	
C43	5000			BPD-005	DD-502	K06G	S1I-005	DC-525	5HK-D5	
C44	5000		250175-1	BPD-005	DD-502	K06G	S1I-005	DC-525	5HK-D5	
C45	68		250218-7	N750-D68	TCN-68	N03S	N750L-680		5TCU-Q68	
C46	22			SI22	D3-220	TP3J	GP1K-220	UC-5422	5GA-Q22	
C47	5000		250175-1	BPD-005	DD-502	K06G	S1I-005	DC-525	5HK-D5	
C48	5000		250175-1	BPD-005	DD-502	K06G	S1I-005	DC-525	5HK-D5	
C49	68			SI56	D6-560	TP3I	GP1K-560	UC-5456	5GA-Q56	Note 3
C50	68			SI56	D6-560	TP3I	GP1K-560	UC-5456	5GA-Q56	Note 3
C51	1000		250218-5	BPD-001	DD-102	K06G	S01-001	DC-531	5HK-D1	
C52	10000		250175-5	BPD-01	DD-103	K08I	S1I-01	DC-511	5HK-S1	
C53	6800		250175-39	SPD-0068	DD-682	K08I	S1I-0068		5HK-D68	Note 4
C54	5000		250175-1	BPD-005	DD-502	K06G	S1I-005	DC-525	5HK-D5	
C55	10000		250175-5	BPD-01	DD-1033	K08I	S1I-01	DC-511	5HK-S1	
C56	.0047	600	250201-5	SI4700	DD-472		CU3MD47	GP2-333-472	PT8247	47M-D47
C57	.0022	400	250201-3	SI2300	DD-222		CU3BD22	GP2-333-223	PT8222	47M-D23
C58	180		250228-534	SI180	DD-181	TP3E	GP1K-181	UC-5315	5GA-T15	
C59	.1	400	250211-13	P288N-1		DF-104	CU3AP1	PT401	47M-P1	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	MAGNAVOX PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C60A	2000									
B	5000		●250188-1		+PA-110	+PC-100	+115T3G1	+6405-01	+V-1	
C	5000									
C61	5000		250218-13		1464-005		1R5D5		MC3465	MS-35
C62	2700	500	250180-1049		1464-0027		1R5D27		MC4461	MS-227
C63	.047	400	250212-7							
C64	1000		250218-8		1464-001		1R5D1	511-103	MC3256	MS-31
C65	.1	400	250211-13		P488N-1	DF-104	CU3AP1		PT401	47M-P1
C66	.047	400	250211-11		BPD-05	DF-503	CU3AE47		PT4147	47M-S47
C67	1000		250218-8		BPD-001	DD-102	K06G	501-001	DC-521	5HK-D1
C68	1000		250218-8		BPD-001	DD-102	K06G	501-001	DC-521	5HK-D1
C69	.1	800	250301-13		P688N-1	DF-104	CU3EP1		PT401	47M-P1
C70	.0047	400	250212-6		1464-0047		1R5D47		MC3465	MS-247
C71	.047	400	250212-5		BPD-05	DF-503	CU3AE47		PT4147	47M-S47
C72	3900		250229-482		1464-0039		1R5D39		MC3463	MS-239
C73	360		250229-343		1464-00036		1R5T36	511-351		MS-336
C74	1000		250218-8		BPD-001	DD-103	K06G	501-001	DC-521	5HK-D1
C75	470		250233-346		1459-00047	D6-471	5R5T47	511-471	MC3245	MS-347
C76	1000		250218-8		BPD-001	DD-103	K06G	501-001	DC-521	5HK-D1
C77	.047	400	250211-11		BPD-05	DF-503	CU3AE47		PT4147	47M-S47
C78	.047	400	250211-11		BPD-05	DF-503	CU3AE47		PT4147	47M-S47
C79	88	4000	250175-33		SVD-50-68		DD450-680			10MK-S1
C80A	10000	1000	250219-3				DD-103			10MK-S1
B	10000	1000					DD-103			10MK-S1

* Items C60A, C60B, C60C, R77A, R77B and R77C are combined in one unit.
Note 3. When C49 is 100MMF (part #250207-46) C50 is not used.
Note 4. Not used in versions with separate audio chassis.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	MAGNAVOX PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	5000Ω	2	230133-1	V-135	A45-5000	WPK5000	R5000L	Contrast (Wire Wound)
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	DS-36	Attach to R1A.
R2A	50KΩ	½	230132-1	BX-31	A47-50K-S	Q11-123	TA54L	Horizontal Hold
B	Shaft		Not Req.	Not Req.	FXS-1A	Not Req.	Not Req.	Attach to R2A.
R3A	200KΩ	½	230132-3	BX-66	A47-200K-S	Q11-129	U-43	Brightness
B	Shaft		Not Req.	Not Req.	FXS-1A	Not Req.	Not Req.	Attach to R3A.
R4A	1.2Meg	½	230132-4	BX-743	A47A-1.2Meg-S	Q11-138	TA15L	Vertical Hold
B	Shaft		Not Req.	Not Req.	FXS-1A	Not Req.	Not Req.	Attach to R4A.
R5A	500KΩ	½	230132-6	AB-80	A47-500K-S	Q13-133	U-42	Tone
B	Shaft		Not Req.	AK-1	FXS-1A	Not Req.	Not Req.	Attach to R5A.
R6A	1Meg	½	230126-48	AB-70	A47-1Meg-S	Q13-137	U-53	Volume
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R6A.
C	Switch		Not Req.		ES-1	SWE-13	76-1	Vertical Linearity (Wire Wound)
R7	3000	2	230130-3			3S-3000		Vertical Height
R8A	2.5Meg	½	230146-2	AB-83		A47-2.5Meg-S	Q11-259	TA255L
B	Shaft		Not Req.	AK-1		FXS-1A	RQ	Not Req. Attach to R8A.

Note 1. Switch not used on chassis CTB470AA and CMUB470AA.

RESISTORS

ITEM No.	RATING: OHMS	WATTS	MAGNAVOX PART No.	IRC PART No.	NOTES
R9	100KΩ	½	230104-86	BTS-100K	
R10	470KΩ	½	230104-94	BTS-470K	
R11	470KΩ	½	230104-94	BTS-470K	
R12	4.7MΩ	½		BTS-470	
R13	680Ω	½	230104-80	BTS-680	
R14	33000Ω	½	230104-78		
R15	22KΩ	½	230104-78		
R16	150Ω	½	230104-52	BTS-150	
R17	33KΩ	½	230104-85	BTS-33K	
R18	330KΩ	½	230104-92		
R19	130Ω	½	230104-47		
R20	68KΩ	½	230104-84		
R21	470KΩ	½	230104-94		
R22	100Ω	½	230104-46	BTS-100	
R23	120Ω	½	230105-63	BTA-120Ω	
R24	470KΩ	½	230104-94	BTS-470K	
R25	9.1MegΩ 5%		230094-254	BTS-9.1MegΩ5%	
R26	330KΩ 5%		230094-219	BTS-330K 5%	
R27	10KΩ 5%		230094-183		
R28	100Ω		230104-43	BTS-100Ω	
R29	56Ω		230104-47	BTS-56	
R30	18KΩ 5%		230094-187		
R31	100Ω		230104-43	BTS-100Ω	
R32	100Ω		230104-43	BTS-100Ω	
R33	56Ω		230104-47	BTS-56	
R34	470Ω 5%		230094-134		
R35	100Ω		230104-42	BTS-100Ω	
R36	220Ω		230104-54	BTS-220	
R37	39000 5%		230094-177	BTS-39Ω 5%	
R38	33KΩ		230104-80	BTS-33K	
R39	1Meg		230104-90	BTS-1Meg	
R40	22KΩ 5%		230094-181	BTS-22K 5%	
R41	39Ω 5%		230094-125	BTS-39 5%	
R42	560Ω		230104-50	BTS-560	
R43	470Ω		230105-70	BTA-470Ω	
R44	470Ω		230105-70	BTA-470Ω	
R45	470KΩ		230104-94	BTS-470K	
R46	470KΩ		230104-94	BTS-470K	
R47	330Ω		230104-60	BTS-330	
R48	270KΩ		230104-91	BTS-270K	
R49	56KΩ		230104-231	BTS-56K	
R50	120KΩ 5%		230094-210	BTS-120K 5%	
R51	100KΩ		230094-207	BTS-100K	
R52	100Ω		230104-43	BTS-100Ω	
R53	82Ω		230104-49	BTS-82	
R54	270KΩ		230104-91	BTS-270K	
R55	100Ω		230104-42	BTS-100Ω	
R56	47KΩ		230104-82	BTS-47K	
R57	22KΩ		230104-78	BTS-22K	
R58	100KΩ		230104-86	BTS-100K	

ITEM No.	RATING: OHMS	WATTS	MAGNAVOX PART No.	IRC PART No.	NOTES
R59	100KΩ	½	230104-86	BTS-100K	
R60	68KΩ	½	230104-84	BTS-68K	
R61	4.7Meg	½	230104-106	BTS-4.7Meg	
R62	12KΩ	½		BTS-12K	
R63	1.13Meg 5%	½	230094-233	BTS-1.13Meg5%	
R64	470KΩ	½	230104-94	BTS-470K	
R65	1Meg 5%	½	230094-231	BTS-1Meg 5%	
R66	270Ω	2	230106-55	BTS-270	Note 1
R67	330Ω	1	230105-89	BTA-330Ω	Note 1
R68	18KΩ	½	230104-77	BTS-18K	
R69	470KΩ	½	230104-94	BTS-470K	
R70	4.7Meg	½	230104-106	BTS-4.7Meg	
R71	1Meg	½	230105-98	BTA-1Meg	
R72	1Meg	½	230105-98	BTA-1Meg	
R73	22KΩ	½	230104-78	BTS-22K	
R74	33000Ω 5%	½	230094-171	BTS-33Ω0 5%	
R75	3000Ω 5%	½	230094-170	BTS-3000 5%	
R76	270Ω	3	230106-55	BTS-270	
R77A	22KΩ			BTS-22K	
B	●2200Ω		● 250188-1	BTS-2200	
C	●2000Ω			BTS-2200	
R78	47KΩ	½	230104-83	BTS-47K	
R79	1Meg	½	230105-98	BTA-1Meg	
R80	270KΩ	½	230105-91	BTA-270K	
R81	1.6Meg	½	230094-236	BTS-1.6Meg	
R82	1.5Meg 5%	½	230104-100	BTS-1.5Meg	
R83	NTC		230150-1		Note 2
R84	1.2Meg	½	230105-99	BTA-1.2Meg	
R85	15KΩ 5%	½	230104-75	BTS-15K 5%	
R86	1000Ω	½	230104-62	BTS-1000	
R87	220Ω	½	230104-54		
R88	22KΩ	½	230104-78		
R89	100KΩ	½	230104-98		
R90	100KΩ	½	230104-86		
R91	470KΩ	½	230104-94		
R92	4.7Meg	½	230104-106		
R93	68000 5%	½	230094-179		
R94	13000 5%	½	230094-162		
R95	100KΩ	½	230104-207		
R96	150KΩ 5%	½	230094-211		
R97	13KΩ	½	230104-75		
R98	470KΩ	½	230104-94		
R99	10KΩ	½	240071-9	PW10-10K	
R100	100Ω	½	230105-64	BTA-100Ω	
R101	15KΩ	½	230105-76	BTA-15K	
R102	1Ω	2	230106-41		
R103	680Ω	½	230104-72	BTS-680	
R104	3.9Ω	1	230107-3		
R105	680Ω	½	230104-80	BTA-680	
R106	120KΩ	½	230105-1	BTS-120K	

Note 1. Not used in chassis with separate audio chassis.
Note 2. Negative temperature coefficient resistor. Do not mesmura.
* Items R77A, R77B, R77C, C60A, C60B, C60C are combined in one unit.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC.	SEC. 2	SEC. 3	REPLACEMENT DATA: MAGNAVOX PART No.	Hallodrson PART No.	Merit PART No.	Stancor PART No.	Thordrson PART No.	Triad PART No.
T1	117VAC	575VCT	5V	6.3V	300077-1	P8733	P3077	P8184		R-32BC ①
	▲ 1.7A	220A	▲ 3A	▲ 9.5A						

① Parallel and phase 5.3V ② 6A windings, tape 6.3V ③ 1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: MAGNAVOX PART No.	Hallodrson PART No.	Merit PART No.	RCA TYPE No.	Ram PART No.	Stancor PART No.	Thordrson PART No.	Triad PART No.
T3	Horiz. Output Trans.	380253						FLY-79 *	
		380253-1 ①						FLY-79 *	
T3	Vert. Output Trans.	380255-1						MS-247	
T4A	Yoke(90°) Horiz.(11MM)	380417-3 ②	DF507 ③	MDF-23 ③	23SD1 ③	T90F1643 ③	DY-16A ③	Y-16 ③	Y-41-1 ③
B	Vert.(46MM)	380417-1 ①	DF507 ③	MDF-23 ③	23SD1 ③	T90F1643 ③	DY-16A ③	Y-16 ③	Y-41-1 ③
T5A	Horiz. Width-Series Coil (.2-3.3MH)	380585-3		MWC-10				WC-24	
B	Parallel Coil (4.3-32MH)								

① Alternate Magnavox Part No.
② Does not include rear cover (Magnavox Part No. 380410-1, or 380619-1) nor leads.
③ Use original yoke damping network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Hallodrson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordrson Replacement Connections	Triad Replacement Connections
8						8	
5						5	
4						4	
3						3	
2						2	
1						1	
Connect Width Coil Across	2 & 1					2 & 1	
Special Notes						③	

③ If insufficient width, add capacity (Approximately 50-100MMF ③ 4KV (MINIMUM) across horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC	MAGNAVOX PART No.	Hallodrson PART No.	Merit PART No.	Stancor PART No.	Thordrson PART No.	Triad PART No.	NOTES
T6	3.5KΩ	3-4Ω	320069-2	21007	A3018	A3544	26S50	C-53X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP	MAGNAVOX PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	6"	PM	6-8Ω	583586	8A2126	20S54	
SP2	8"	PM	6-8Ω	583587	8A2126	20S54	

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC.	MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	0Ω						
L2	IF Trap	0Ω						
L3	IF Trap	0Ω						
L4	IF Trap	0Ω						
L5	Ant. Trans.	0ΩCT	0Ω	380490-3				
L6	IF Trap	3.6Ω		380601-8				4.7 Microhenries, IRC Part No. CLA
L7	VHF Ant. Coils	0Ω						Channel 13
L8	VHF Ant. Coils	0Ω						
L9	UHF IF Coil	0Ω						
L10	UHF IF Coil	0Ω		380602-1				
L11	Neut. Coil	0Ω						
L12	VHF RF Coil	0Ω						Channel 13
L13	VHF RF Coils	0Ω						
L14	VHF IF Coil	0Ω						
L15	VHF Mixer Grid Coil	0Ω						Channel 13
L16	VHF Mixer Grid Coils	0Ω						Channel 13
L17	UHF IF Coil	0Ω						
L18	VHF Osc. Coil	0Ω						
L19	VHF Osc. Coils	0Ω						Channel 13
L20	VHF Osc. Coil	0Ω						Channel 6 1 Microhenry
L21	RF Coil	1.9Ω		380601-9				
L22	Conv. Plate	.1Ω		380601-1				
L23	1st Video IF	.2Ω		380624-1	17-4524 *	TV-150 ■	6219 ■	
L24	2nd Video IF	.1Ω	.1Ω	380624-1	17-4524	TV-150	6219	
L25	3rd Video IF	.1Ω	.1Ω	380623-1	17-4503 ▲	TV-152 ▲	6218 ▲	Includes 47.25MC Trap
L26	Shunt Peaking Coil	1Ω		380623-6	19-3500		6138	450 Microhenries
L27	Series Peaking Coil	6.8Ω		380623-5	19-3180	TV-154	6180	176 Microhenries
L28	Series Peaking Coil	5.5Ω		380623-8	19-3185 ●		6123 ●	125 Microhenries, Wound on 5.6KΩ resistor
L29	1st Sound IF	.8Ω		380584-1	20-1005	TV-151	1469	
L30	2nd Sound IF	.8Ω		380584-1	17-3400	TV-151	1469	
L31	Discriminator	1.5Ω	1.5ΩCT	380623-1	17-3496	TV-114	6205	

■ Use winding with 56KΩ shunt resistor.
▲ Use one winding only.
● Use adaptor plate.
* Parallel with 5.6KΩ resistor.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MAGNAVOX PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L32	58Ω		360579-1	19-1576	TV-163	6210			HS-5	

FILTER CHOKE

ITEM No.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000 ~)	REPLACEMENT DATA: MAGNAVOX PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L33	.220A	38Ω	.6HY	320058-2	C5037 ①	C2996 ①	C2326 ①	26C44 ①	C-17X ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA: MAGNAVOX PART No. FUSE	MAGNAVOX PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG S/B	150MA 125V			313.150 (3AG S/B 15/100A)	357001	MDL 15/100	4405

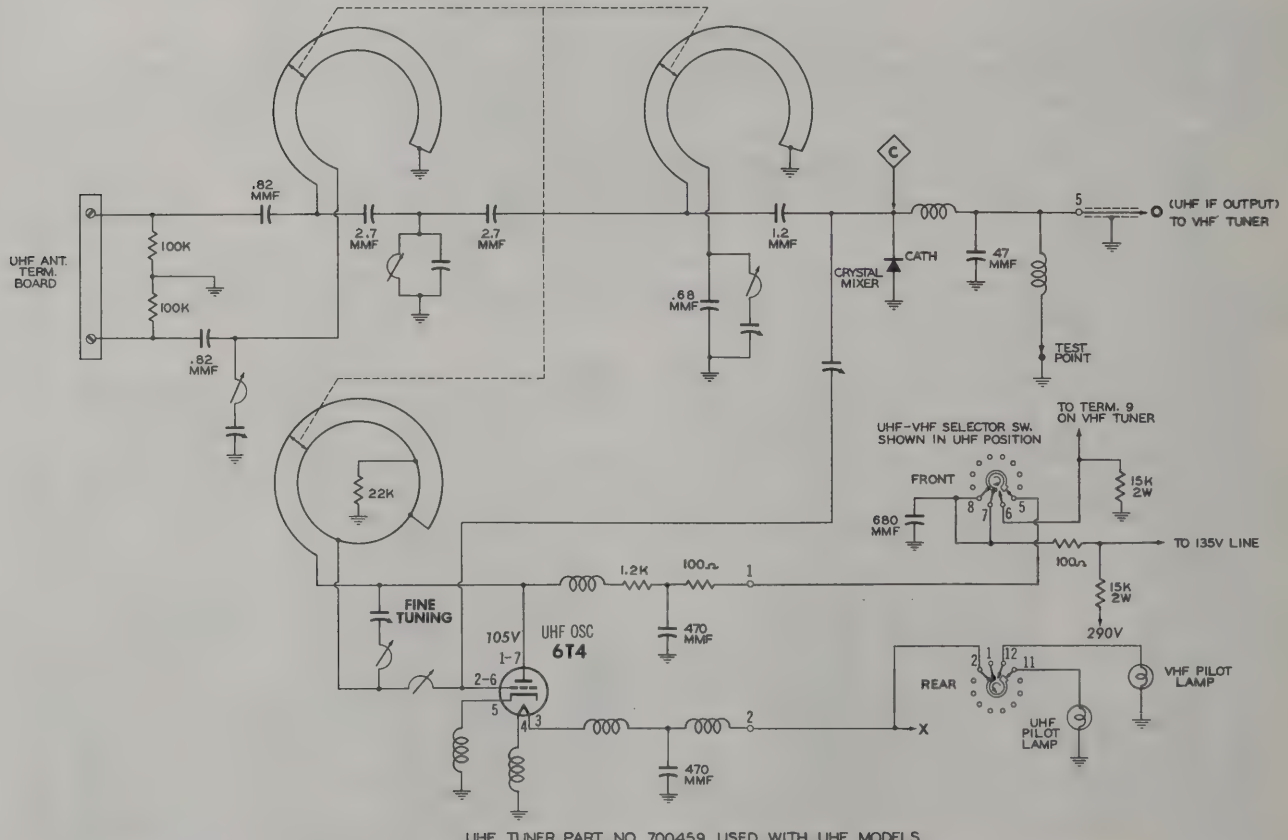
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: MAGNAVOX PART No.	REPLACEMENT DATA: SYLVANIA PART No.	NOTES
M2	1N60 *		1N60	Video Det. (Pigtail)

* Some versions may use crystal diode type 1N64 in this application.

MISCELLANEOUS

ITEM No.	PART NAME	MAGNAVOX PART No.	NOTES
M3	Dial Light		#47 (VHF)-All Chassis
M4	Tuner	700458-2	VHF- All chassis
M5	Tuner	700459-1	UHF-Chassis CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA
M6	Video Det. Assy.	360607-1	Includes M2, Coils, Capacitor, & Resistor
M7	Switch	160251-1	AC Interlock-Chassis CTA466AA, CMUA466AA, CTA474AA, CMUA474AA
	Switch	160253-2	AC Interlock-Chassis CTA469AA, CMUA469AA
M8	Switch	160174-5	On-off (Power)-Chassis CTB470AA, CMUB470AA
M9	Centering Device	635116-1	
M10	Ion Trap	360492-5	



UHF TUNER PART NO. 700459 USED WITH UHF MODELS

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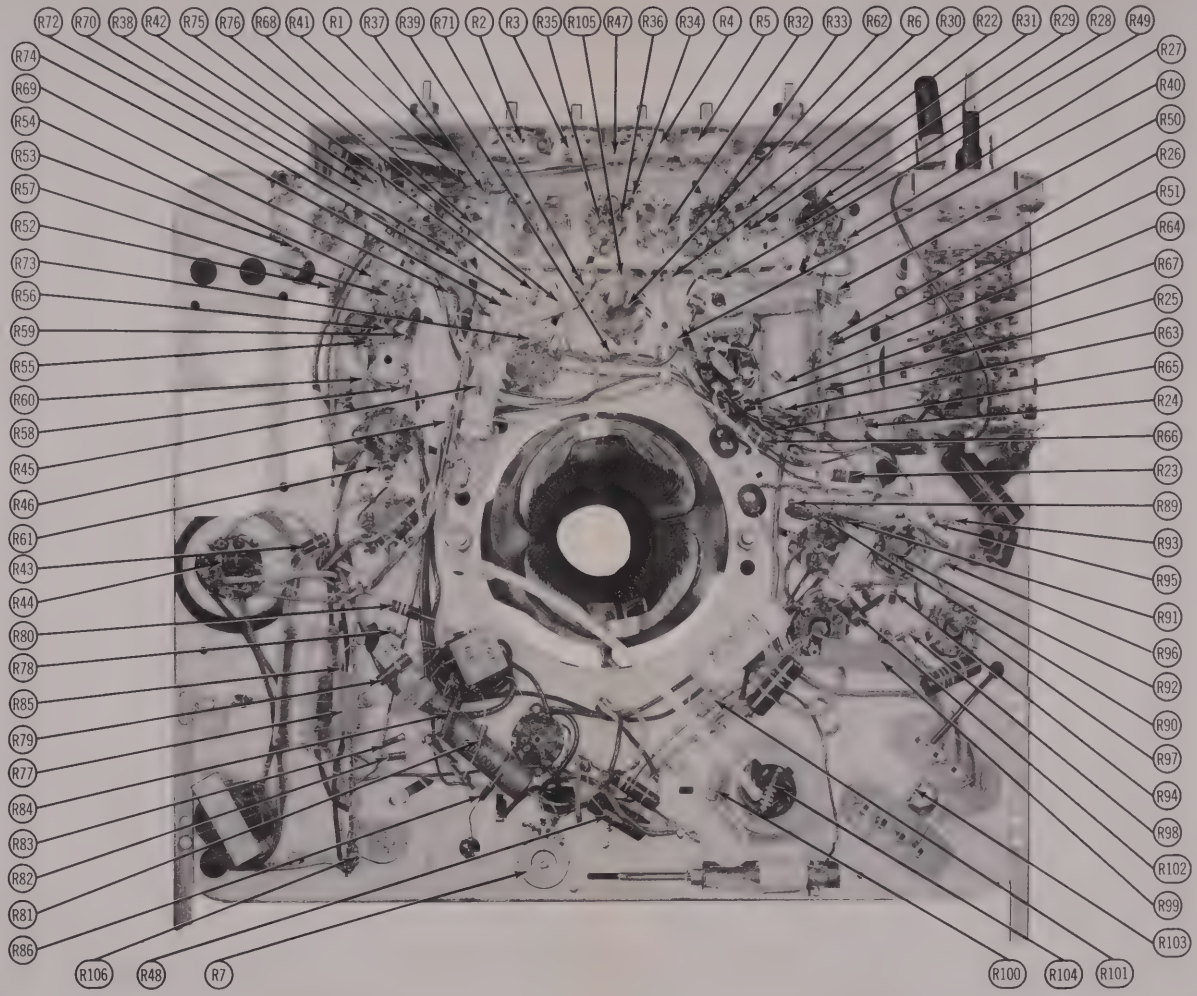
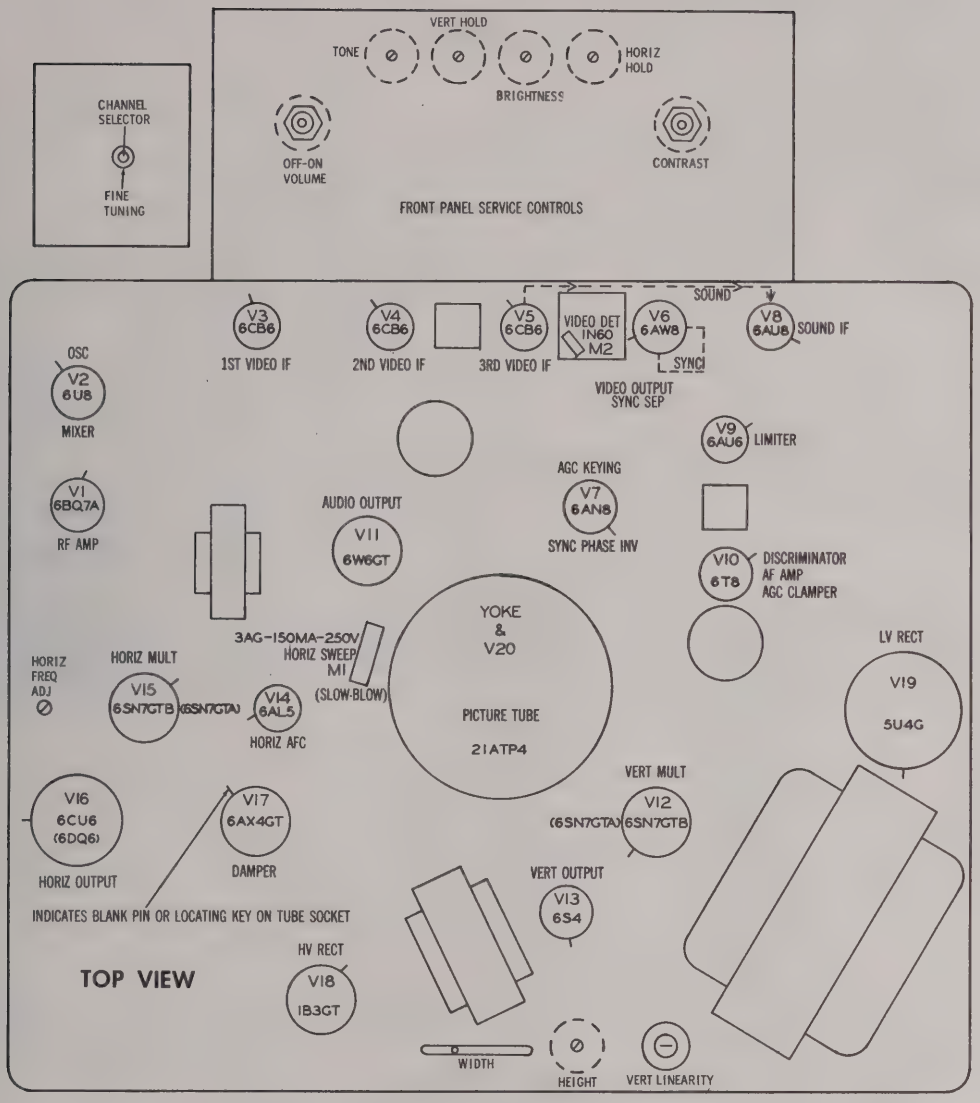
UHF TUNER SCHEMATIC

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V19

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V11
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V20
Has pic, no sound - V8, V9, V10, V11
Overloaded picture - V7, V10

SYNC FAILURE
No vert. sync - V7, V12
No horiz. sync - V7, V14, V15
No vert. or horiz. sync - V6, V7

SWEEP FAILURE
No raster, has sound - V15, V16, V17, V18, V20, Fuse (M1)
No vertical deflection - V12, V13
Poor vert. linearity or foldover - V12, V13
Poor horiz. linearity or foldover - V15, V16, V17
Narrow picture - V15, V16, V17, V18, V19
Vert. off freq. - V7, V12
Horiz. off freq. - V7, V14, V15

MAGNAVOX CHASSIS CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped away from the chassis.
Do not remove the horizontal multivibrator tube (V15) to disable the high voltage.

VIDEO IF ALIGNMENT

Connect the negative lead of a 1.5 volt battery to the ungrounded side of C3.
Connect positive side to chassis.
Connect the negative lead of a 3 volt battery to the ungrounded side of C28.
Connect the positive lead to chassis. A single tapped 4.5 volt battery may be used for this purpose if available.
In step 1 it is possible to obtain two settings of A1 at which two maximum attenuations will occur. Correct adjustment will be indicated when 47.25MC marker is centered in the trap and the core is farthest out of the coil.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001MFD	High side to pin 1 (grid) of 6CB6 (V3). Low side to chassis.	43.0MC (10MC Swp.)	47.25MC	Any unused high band channel	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1	Couple a second generator to point B to provide markers. Adjust to center 47.25MC marker in trap notch as in Fig. 1. Use enough sweep output so that trap notch is visable on scope.
2.	"	"	"	42.75MC 45.0MC 45.75MC 47.25MC	"	"	A2, A3, A4	Attenuate sweep generator output for 2 volts peak to peak on scope. Adjust for response similar to Fig. 1. Adjust A2 for maximum gain and MINIMUM tilt. A3 position 45.75MC marker. A4 positions 42.75MC marker. Recheck A1 adjustment for correct 47.25MC position. See Fig. 1.
3.	"	High side to point (B). Low side to chassis.	"	"	"	"	A5, A6	Adjust A5 for maximum gain and to place 45.75MC marker at 50% on response curve as in Fig. 2. Adjust A6 for maximum amplitude and correct tilt. Repeat adjustment of A5 and A6 (if necessary) several times to obtain response within limits in Fig. 2.
4.	Fig. 3	Thru matching network (Fig. 3) to VHF antenna terminals.	213MC (10MC Swp.)	"	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Couple marker generator loosely to pin 1 (grid) of 6CB6 (V3). Check for response similar to Fig. 2 on all VHF channels. Response should be within limits shown by dotted lines. If necessary, repeat steps 1 thru 4.
			207MC (10MC Swp.)	"	12			
			201MC (10MC Swp.)	"	11			
			195MC (10MC Swp.)	"	10			
			189MC (10MC Swp.)	"	9			
			183MC (10MC Swp.)	"	8			
			177MC (10MC Swp.)	"	7			
			85MC (10MC Swp.)	"	6			
			79MC (10MC Swp.)	"	5			
			69MC (10MC Swp.)	"	4			
			63MC (10MC Swp.)	"	3			
			57MC (10MC Swp.)	"	2			
5.	1000Ω Carbon Resistors	High side to point (C) thru 1000Ω. Low side to chassis.	43MC (10MC Swp.)	45.75MC	UHF	"	A7	Turn tuner to UHF position. Adjust A7 to place 45.75MC marker at 50% on high frequency slope of response curve, (Fig. 2).

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
6.	.005MFD	High side to pin 7 (grid) of 6AW8 (V6). Low side to chassis.	4.5MC (Unmod.)	Any unused channel.	DC probe thru 10KΩ to point (E). Common to chassis.	A8, A9, A10	Adjust for maximum output. Keep input signal at lowest point possible for an accurate indication.
7.	"	"	"	"	DC probe thru 10KΩ to point (F). Common to chassis.	A11	Adjust for MINIMUM deflection. A positive and negative reading will be obtained on either side of correct setting.

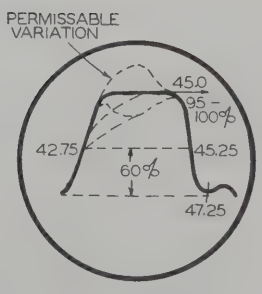


FIG. 1

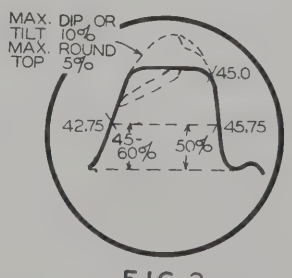


FIG. 2

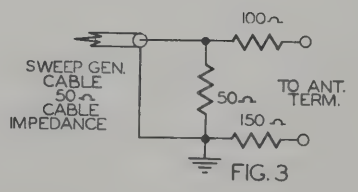


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Loosely couple an RF signal generator to the grid of the first video IF amplifier tube (V3) and tune it accurately to 45.75MC.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

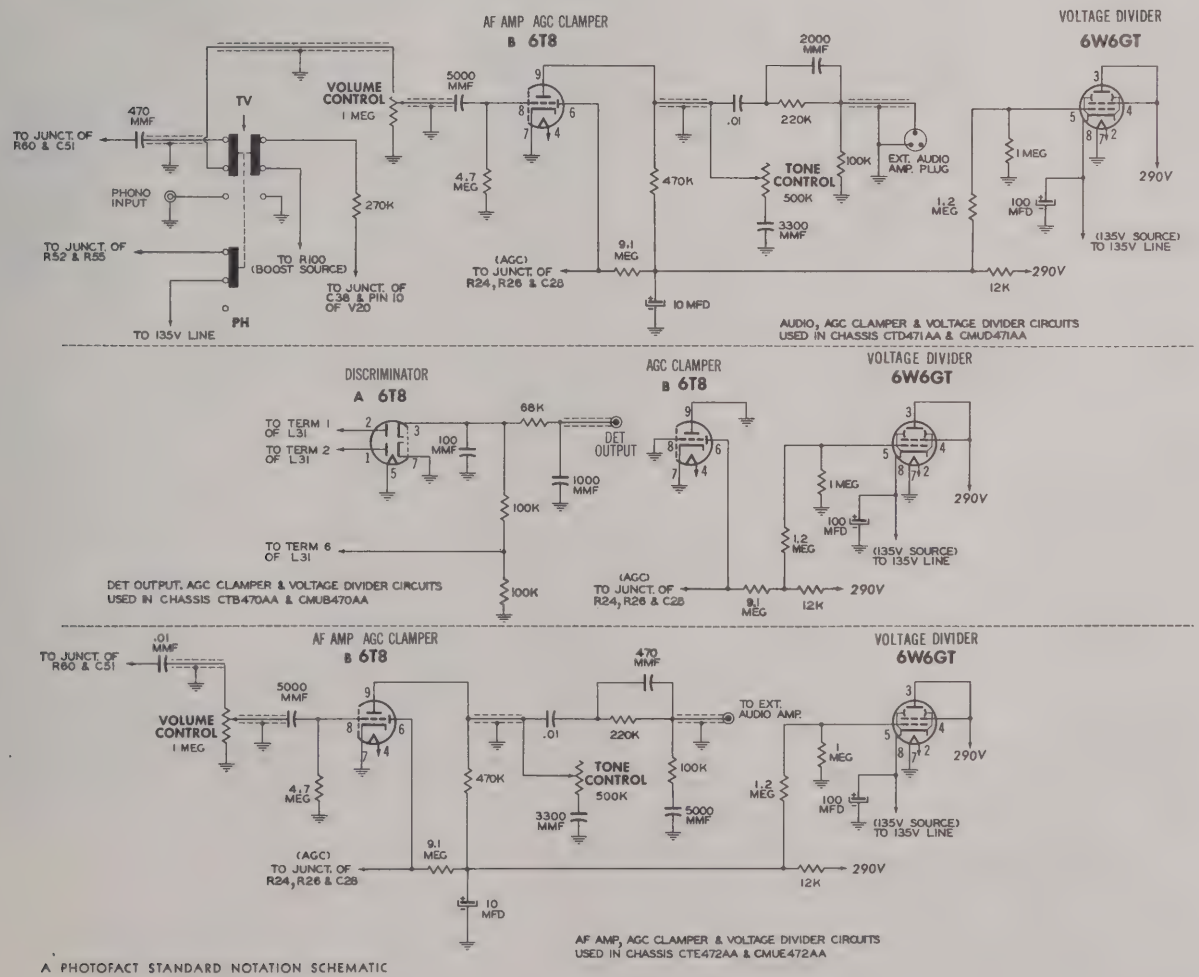
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
8.	Fig. 3	Thru matching network (Fig.3) to antenna terminals.	213MC (10MC Swp.)	211.25MC 45.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A12	Adjust so that Video RF and Video IF markers coincide on response curve.
9.	"	"	207MC (10MC Swp.)	205.25MC 45.75MC	12	"	A13	Adjust position of loops so that Video RF and Video IF markers coincide on response curve.
			201MC (10MC Swp.)	199.25MC 45.75MC	11		A14	
			195MC (10MC Swp.)	193.25MC 45.75MC	10		A15	
			189MC (10MC Swp.)	187.25MC 45.75MC	9		A16	
			183MC (10MC Swp.)	181.25MC 45.75MC	8		A17	
			177MC (10MC Swp.)	175.25MC 45.75MC	7		A18	
10.	"	"	85MC (10MC Swp.)	83.25MC 45.75MC	6	"	A19	Adjust so that Video RF and Video IF markers coincide on response curve.
11.	"	"	79MC (10MC Swp.)	77.25MC 45.75MC	5		A20	Adjust (compress or expand coil turns) so that Video RF and Video IF markers coincide on response curve.
			69MC (10MC Swp.)	67.25MC 45.75MC	4		A21	
			63MC (10MC Swp.)	61.25MC 45.75MC	3		A22	
			57MC (10MC Swp.)	55.25MC 45.75MC	2		A23	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

UHF TUNER ALIGNMENT

The UHF portion of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver is not recommended in the field.



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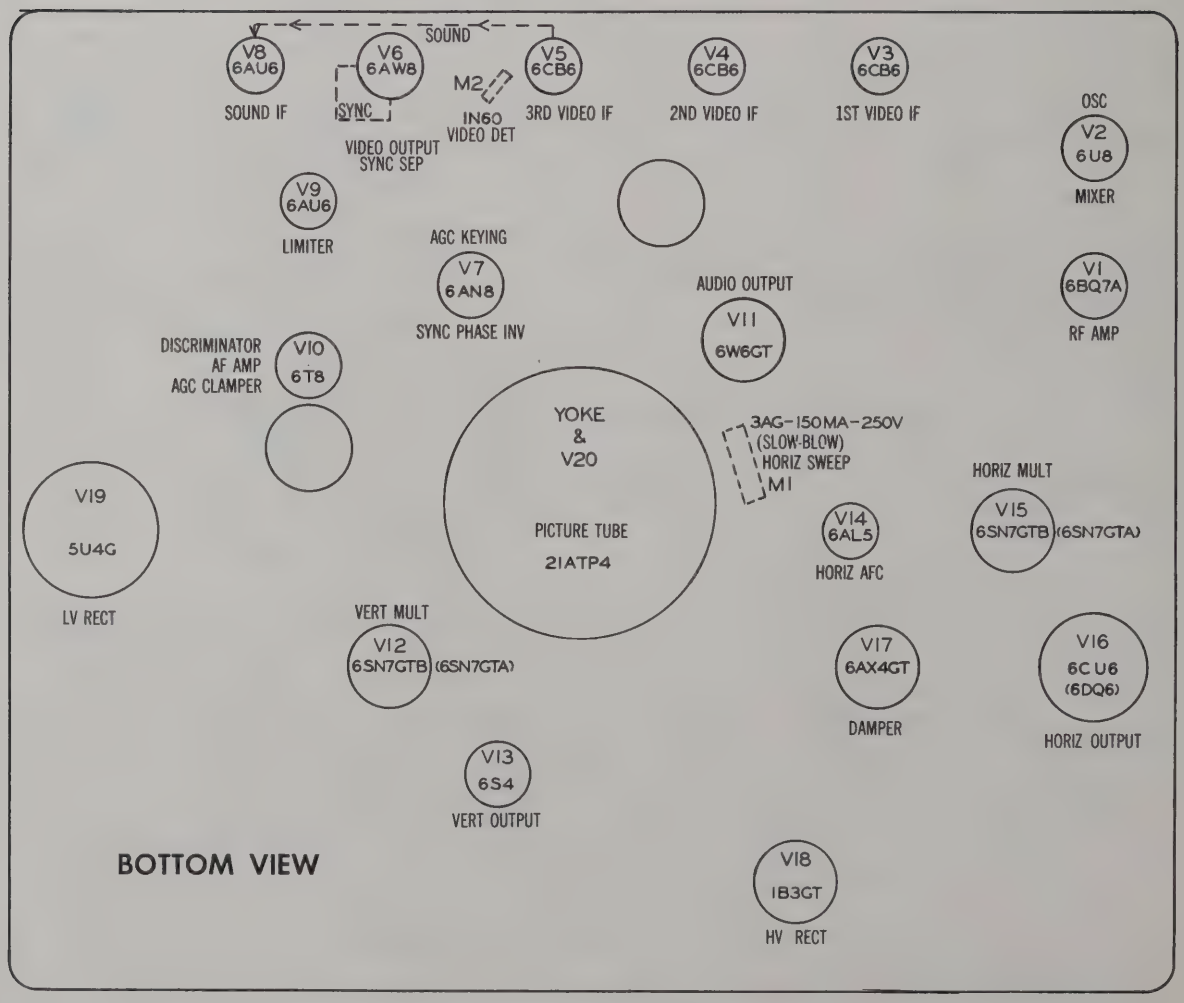
AF AMP & VOLTAGE DIVIDER CIRCUIT

MAGNAVOX CHASSIS CMUA465AA, CMUA466AA, CMUA469AA, CMUA473AA, CMUA474AA, CMUB470AA, CMUD471AA, CMUE472AA, CTA465AA, CTA466AA, CTA469AA, CTA473AA, CTA474AA, CTB470AA, CTD471AA, CTE472AA

RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BQ7A	† 1. 9KΩ	250KΩ	INF	0Ω	. 1Ω	INF	1Meg	0Ω	0Ω
V 2	6U8	■ 250Ω	360KΩ	■ 55KΩ	0Ω	. 1Ω	† 5. 2KΩ	0Ω	0Ω	22KΩ
V 3	6CB6	60KΩ	56Ω	. 1Ω	0Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 4	6CB6	60KΩ	56Ω	. 1Ω	0Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 5	6CB6	. 1Ω	220Ω	. 1Ω	0Ω	■ 1KΩ	■ 1KΩ	0Ω		
V 6	6AW8	0Ω	4. 7Meg	† 1Meg	0Ω	. 1Ω	39Ω	3. 9KΩ	■ 22KΩ	† 15KΩ
V 7	6AN8	† 4KΩ	22KΩ	3. 3KΩ	0Ω	. 1Ω	280KΩ	▲ 1. 5KΩ	† 50KΩ	† 9. 5KΩ
V 8	6AU6	. 5Ω	0Ω	0Ω	. 1Ω	■ 1KΩ	■ 1KΩ	82Ω		
V 9	6AU6	270KΩ	0Ω	. 1Ω	0Ω	■ 1KΩ	■ 40KΩ	0Ω		
V 10	6T8	100KΩ	100KΩ	200KΩ	. 1Ω	0Ω	1Meg	0Ω	4. 7Meg	† 470KΩ
V 11	6W6GT	TP	. 1Ω	† 500Ω	† 3. 6KΩ	550KΩ	TP	0Ω	50KΩ	
V 12	6SN7GTB	1. 8Meg	▲ 1. 7Meg	0Ω	1Meg	▲ 270KΩ	0Ω	. 1Ω	0Ω	
V 13	6S4	NC	2. 5KΩ	1. 5Meg	0Ω	. 1Ω	1. 5Meg	NC	NC	▲ 3. 3KΩ
V 14	6AL5	18Ω	18Ω	. 1Ω	0Ω	5Meg	0Ω	5Meg		
V 15	6SN7GTB	4. 7Meg	† 7. 5KΩ	1. 3KΩ	100KΩ	† 150KΩ	1. 3KΩ	0Ω	. 1Ω	
V 16	6CU6	NC	0Ω	NC	† 10KΩ	470KΩ	TP	. 1Ω	0Ω	TOP CAP ▲ 25Ω
V 17	6AX4GT	NC	NC	20Meg	NC	† 55Ω	NC	. 1Ω	0Ω	
V 18	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ▲ 475Ω
V 19	5U4G	NC	50KΩ	TP	21Ω	NC	23Ω	TP	50KΩ	
V 20	21ATP4	0Ω	■ 22KΩ	PIN 6 ▲ 1. 5KΩ	PIN 10 ▲ 270KΩ	PIN 11 † 250KΩ	PIN 12 . 1Ω			

† MEASURED FROM PIN 8 OF V19.
■ MEASURED FROM 135V LINE.
▲ MEASURED FROM PIN 3 OF V17.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART

MASCO
MODEL E-ZT

MASCO
MODEL E-ZT

TRADE NAME	Masco Model E-ZT
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32 - 28 49th St., Long Island City 3, N. Y.
TYPE SET	AC-DC Operated Intercommunications System
TUBES (One)	Type 12AT7 AF Amplifier - Output
POWER SUPPLY	105 - 125 volts AC-DC RATING .15 Amp. @ 117 Volts AC

PROPERTY OF
L. F. BLANKENSHIP
3924 N. ADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

MASCO
MODEL E-ZT

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MASCO PART No.	STANDARD REPLACEMENT	
V1	AF Amplifier - Output	12AT7	12AT7	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V4040	BBRD4415	TCD49	TDL-D40-150	MTD-1540	TVA-2445
B	40	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C3	5000			BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C4	.1	600		P688N-1	DF-104	CUB6P1		PT601	6TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½		AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft			AK-9	RS-2	Not Req.	Not Req.	Attach to R1A
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R2	5.6Meg	½		BTS-5.6Meg	
R3	470KΩ	½		BTS-470K	
R4	5.6Meg	½		BTS-5.6Meg	

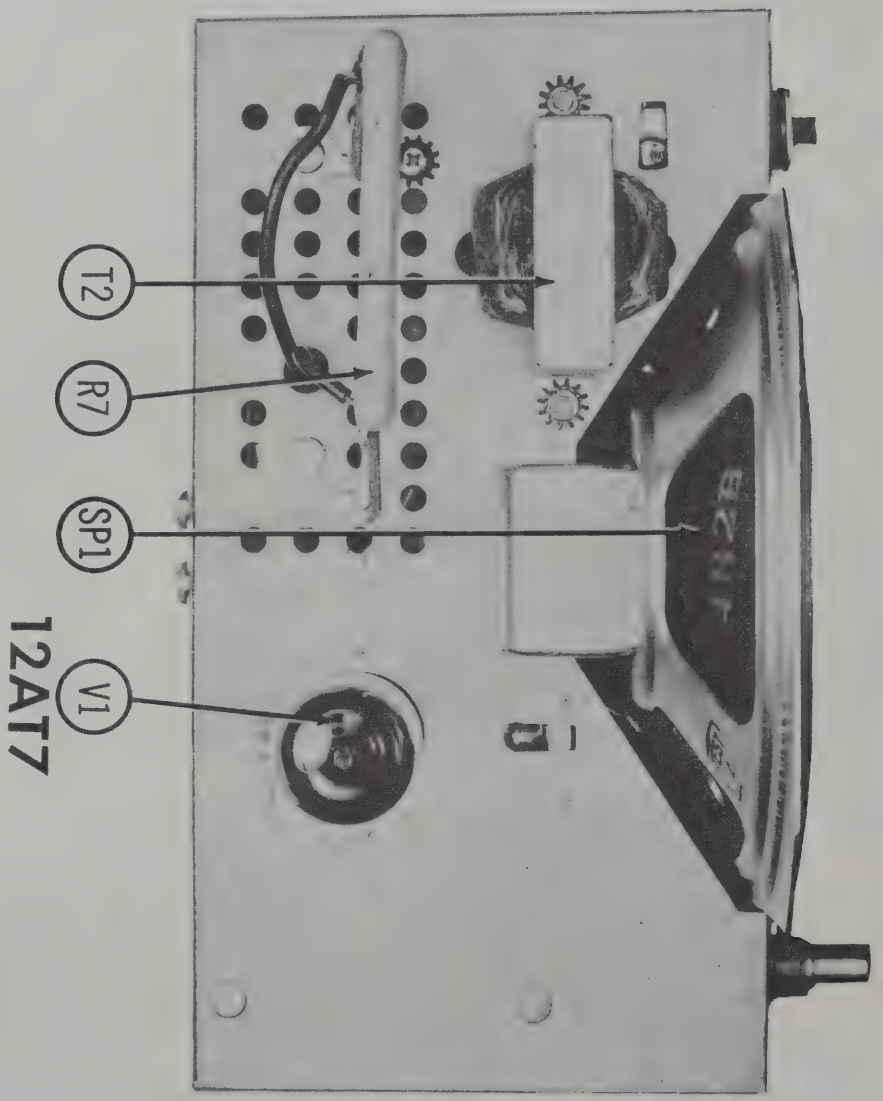
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R5	47Ω	1			
R6	1000Ω	½		BTS-1000	
R7	750Ω	10		PW10-750	

TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	.4Ω	1070Ω			1N-100					

Turns Ratio 1 to 240.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MASCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6.9KΩ	3.4Ω	A-37A16	Z-1110	A-3026	A-3329	24S49		

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MASCO PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3.4Ω	2870	4A06	223S1	

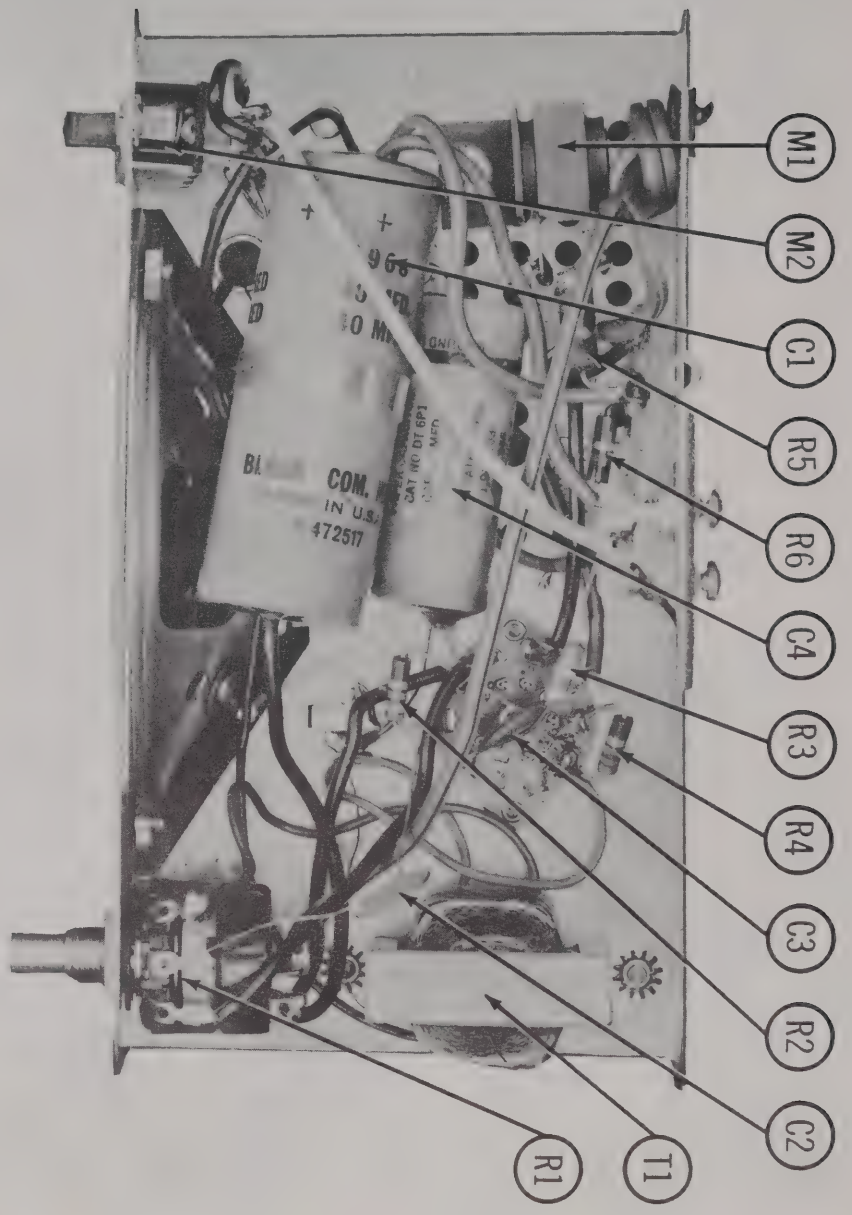
SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MASCO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	RADIO RECEPTOR PART No.	SARKES TARZIAN PART No.	
M1	.007ADC		1263A	RS050	8S35	8Y1	50	

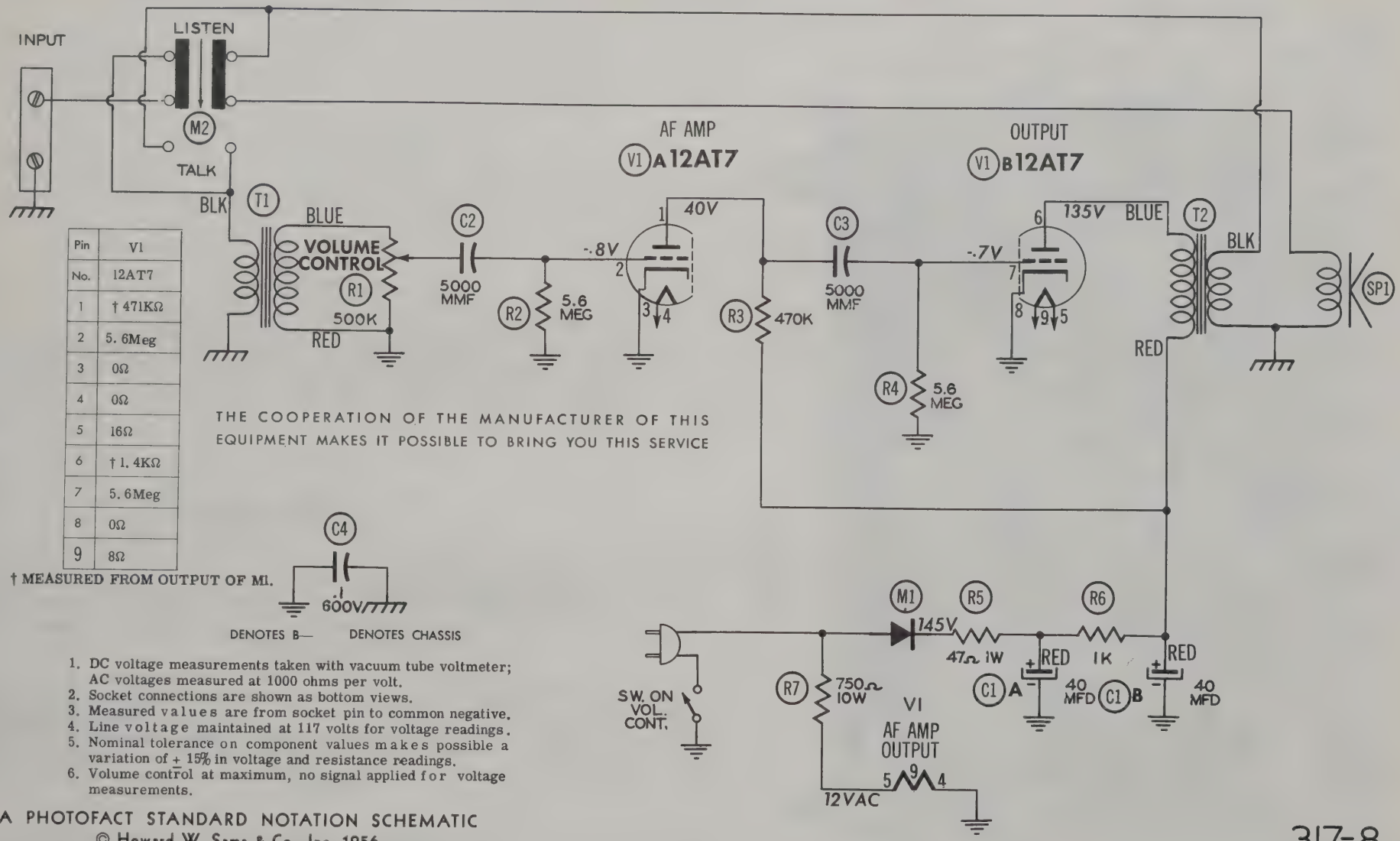
MISCELLANEOUS

ITEM No.	PART NAME	MASCO PART No.	NOTES
M2	Switch		Talk - Listen (DPDT - Slide Type)

CHASSIS—BOTTOM VIEW



MASCO MODEL E-ZT



Pin No.	V1 12AT7
1	† 471KΩ
2	5.6Meg
3	0Ω
4	0Ω
5	16Ω
6	† 1.4KΩ
7	5.6Meg
8	0Ω
9	8Ω

† MEASURED FROM OUTPUT OF M1.

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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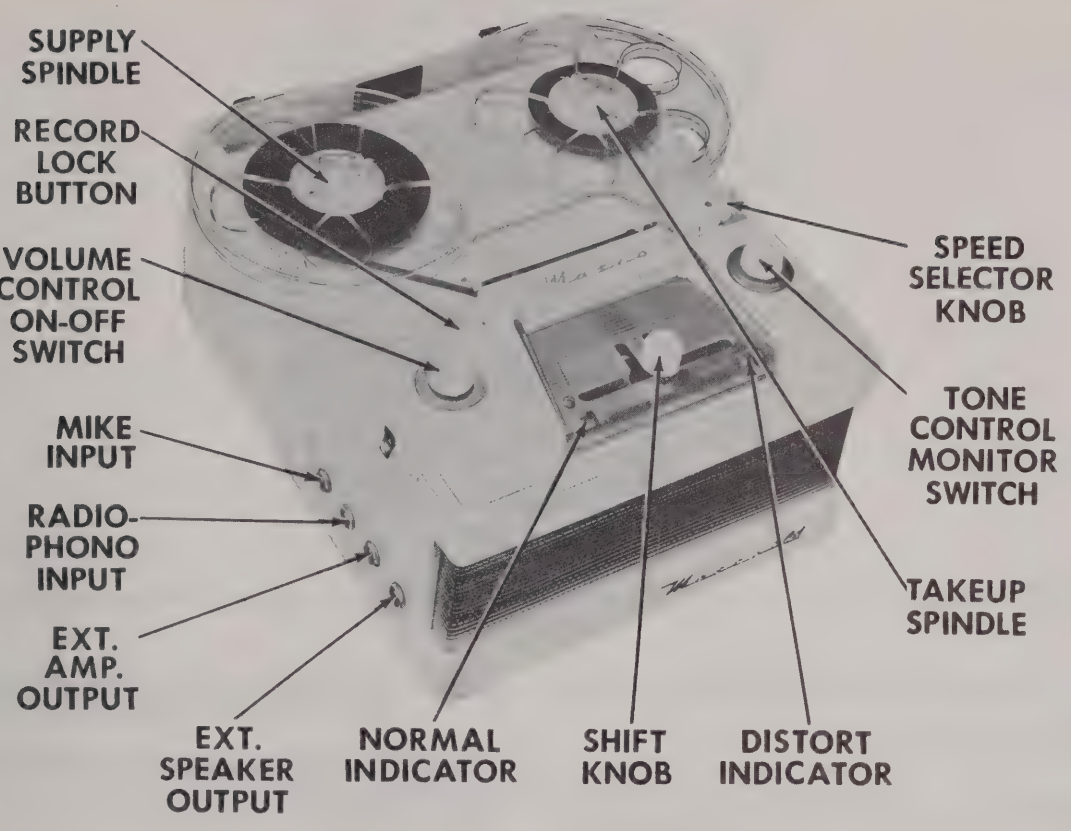

Figure 1

GENERAL INFORMATION

The Masco Model 500 is a dual track, two speed (3.75 and 7.50 ips) tape recorder. A single control knob is used to select the Rewind, Fast Forward, Play, Standby, Record, and Stop functions. There are two inputs: Microphone and Radio-Phono, and two outputs: External Amplifier and External Speaker.

Recordings can be made from a radio, television receiver, or phonograph, in addition to those made directly from the microphone. Recordings can be played back through the self-contained speaker or an external speaker may be used through use of the "External Speaker Output". Should additional power be desired, an external amplifier may be connected to the "External Amplifier Output" jack.

The Masco Model 500 is designed to operate on 60 cycle, 110-120 volts, AC supply only. Before connecting to your line supply be absolutely certain that it agrees with the above specifications.

Manufactured by:

Mark Simpson Mfg. Co., Inc.
32-28 Forty-Ninth Street
Long Island City 3, N. Y.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

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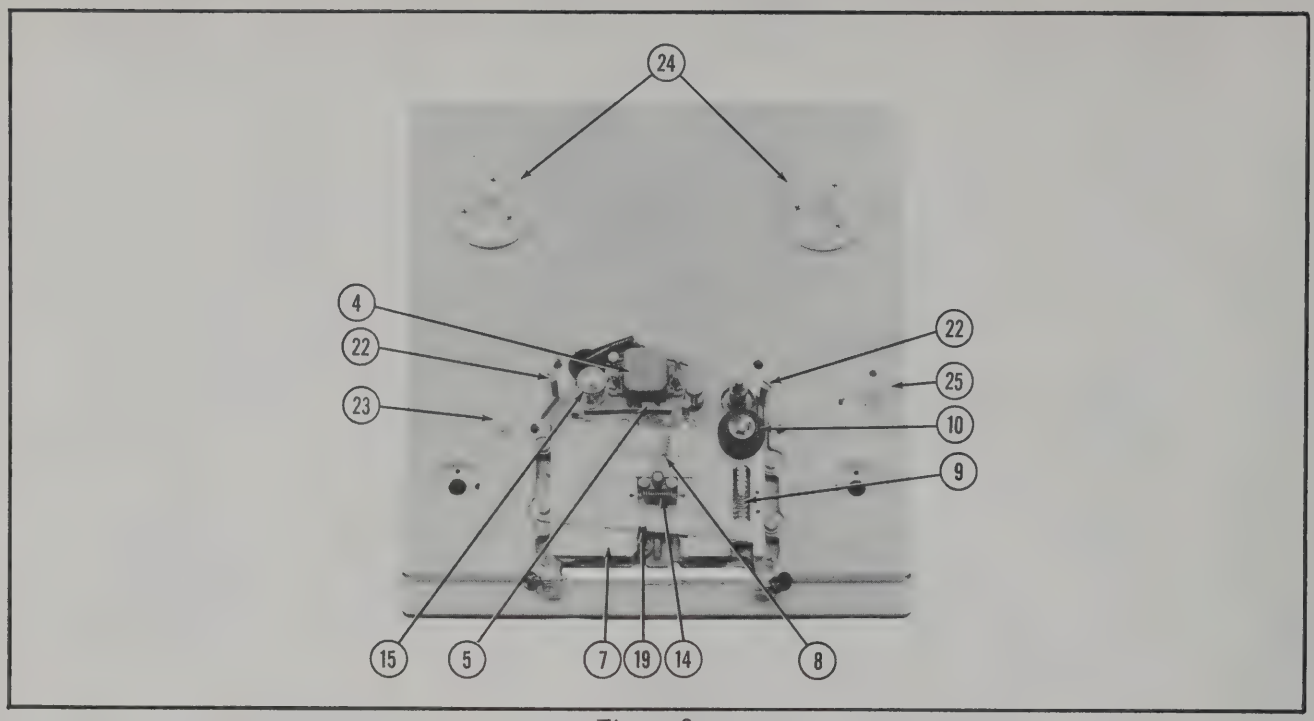


Figure 2

OPERATING INSTRUCTIONS

Preparing For Operation-

1. Remove top cover of carrying case by opening latch bolts and sliding cover off its pins (to the right).

2. Before connecting to line supply, be sure to remove the shipping screw from the top plate. A tag is attached to it to mark it clearly. This shipping screw is used only to protect the recorder while in transit and must be removed for normal use.

Threading The Tape-

1. Use "A" wound plastic base tape (glossy side out). If tape has a gummed piece of tape at the beginning, remove it to prevent the gummy layer from being deposited on the record head which would result in faulty operation of the unit.

2. Place shift knob (1) in the "Stop" position.

3. Place an empty reel on the right hand (Takeup) spindle.

4. Place a full reel of tape, from which a 2-foot length has been unwound, on the left hand (supply) spindle. Make sure the glossy side of the tape faces the front of the unit. Make sure that the reels are fully seated on the spindles.

5. Hold a section of tape straight with both hands and insert the tape in the tape slot. Insert the free end of the tape into the slot in the hub of the empty reel. Rotate the empty reel counterclockwise, by hand, until the tape is secured to the reel and all slack is taken up between reels.

To Record From Microphone-

1. Place the speed change knob (25) in the desired speed position.

NOTE: Speed changes may be effected in any position except "Record" or "Play".

2. Insert the line cord plug into a convenient wall receptacle of the proper rating.

3. Turn the On-Off Volume Control to the right until a click is heard and allow about thirty seconds for the unit to warm up, at which time the "Normal" indicator will glow.

4. Insert the microphone plug into the "Microphone Input" jack.

5. Place the shift knob (1) in "Standby" position. The "Normal" indicator will go out. Talk directly into the microphone in a normal voice, holding the microphone about 12 inches from the lips. The "Standby" position permits the pre-setting of the recording level before actually recording.

6. Observe both the "Normal" indicator and the "Distorted" indicator. Advance the volume control clockwise, while talking, to a point just before the "Distorted" indicator flickers. This is the proper recording level.

NOTE: The Tone Control has no effect while recording.

To Record From Radio, Phono, On T. V. -

1. A six foot patch cord with spring clips at one end and a phone plug on the other is provided for recording from a radio, phonograph, or television receiver. To record directly from a radio or T. V. set, connect the spring clips directly across the voice coil terminals on the speaker and insert the phone plug into the "Radio-Phono Input" jack. To record directly from a phonograph, connect the spring clips across the output of the phono cartridge. Be certain to observe polarity by connecting copper braid shield to copper braid shield.

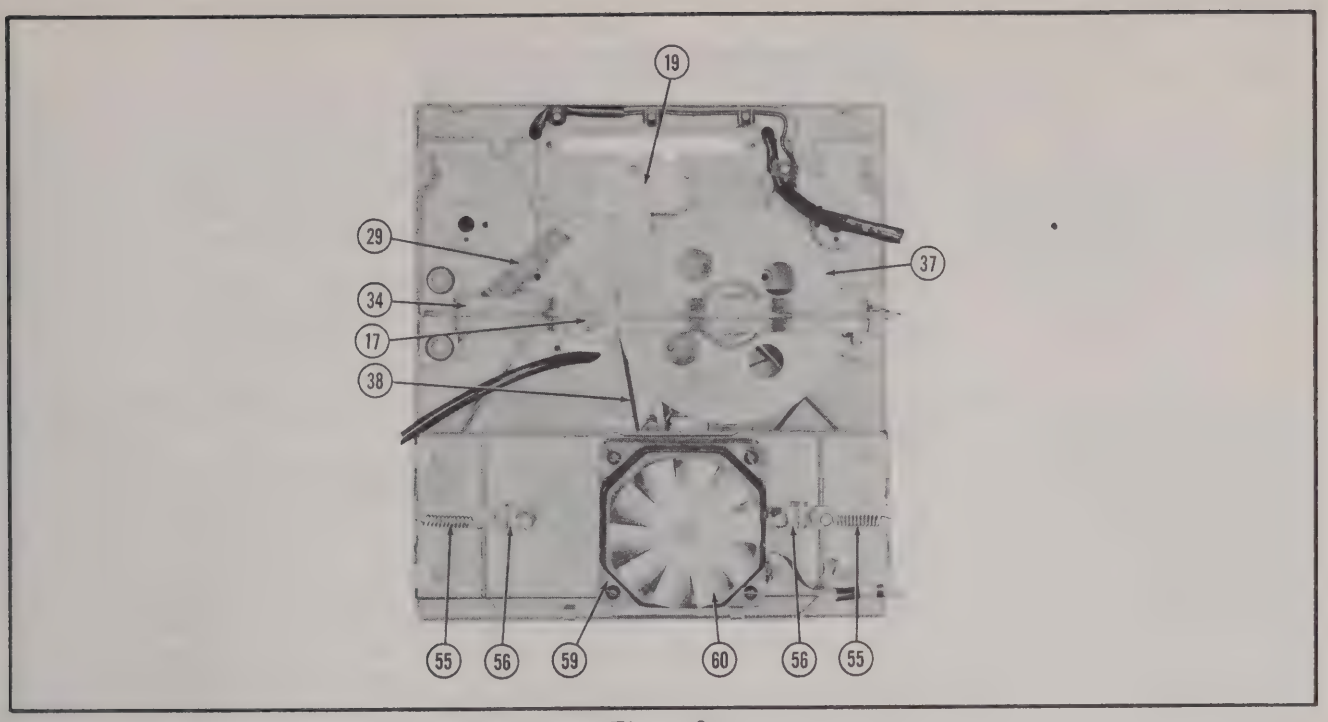


Figure 3

2. Proceed with the recording as described under "To Record From Microphone".

3. While recording, it may be desired to by-pass commercials. Place shift knob (1) in the "Standby" position. Note that the "Normal" indicator continues to flicker. After the commercial has been completed, press the record lock button (23) and place shift knob (1) in the "Record" position. This feature permits the by-passing of commercials without resetting the recording level.

Dual Track Recording-

The Masco is designed so that only one-half the tape width is recorded at a time, thereby resulting in two track recording. This two track operation is accomplished in the following manner:

1. After a reel of tape has been recorded, i.e. all the tape wound onto the take-up reel, place shift knob (1) in the "Stop" position.

2. Remove the reels from the recorder, turning the full reel over and placing it on the left (supply) spindle and the empty reel on the right (takeup) spindle.

3. Properly thread the tape and proceed with the recording.

4. After the second track has been recorded the first track of recording is ready to be played, without rewinding, by reversing the reels as described in Step #2 above.

Fast Forward And Fast Rewind-

High-speed forward or reverse can be obtained by moving the shift knob (1) to either the "Fast Forward" or "Fast Rewind" position. When the unit is in one of these positions, tape will be wound on the desired reel at a high speed.

To Play A Recording-

1. Thread tape as described under "Threading The Tape".

2. Turn recorder on and wait for the "Normal" indicator to light.

3. Turn the "Monitor" switch (located on Tone control) on.

4. Place shift knob (1) in the "Play" position and adjust the "Volume" and "Tone" controls for desired listening level.

To Change Tape Speed-

1. Place shift knob (1) in the "Stop" position.

2. Place speed change knob (25) in the desired position, 3.75 or 7 1/2 inches per second.

NOTE: Insofar as quality of recording-reproduction is concerned, it is generally agreed that speed is an all important factor. The higher the speed, the greater will be the fidelity.

To Monitor While Recording-

There are three ways of listening to a program while it is being recorded, through the built-in speaker, an external speaker, or headphones.

1. Turning the switch on the Tone Control to "On" connects the built-in speaker while material is being recorded.

2. If an external speaker is plugged into the "External Speaker" jack, the program will be heard on the external speaker and not on the internal speaker.

3. Headphones of the crystal, high impedance type, may be plugged into the "External Speaker" jack

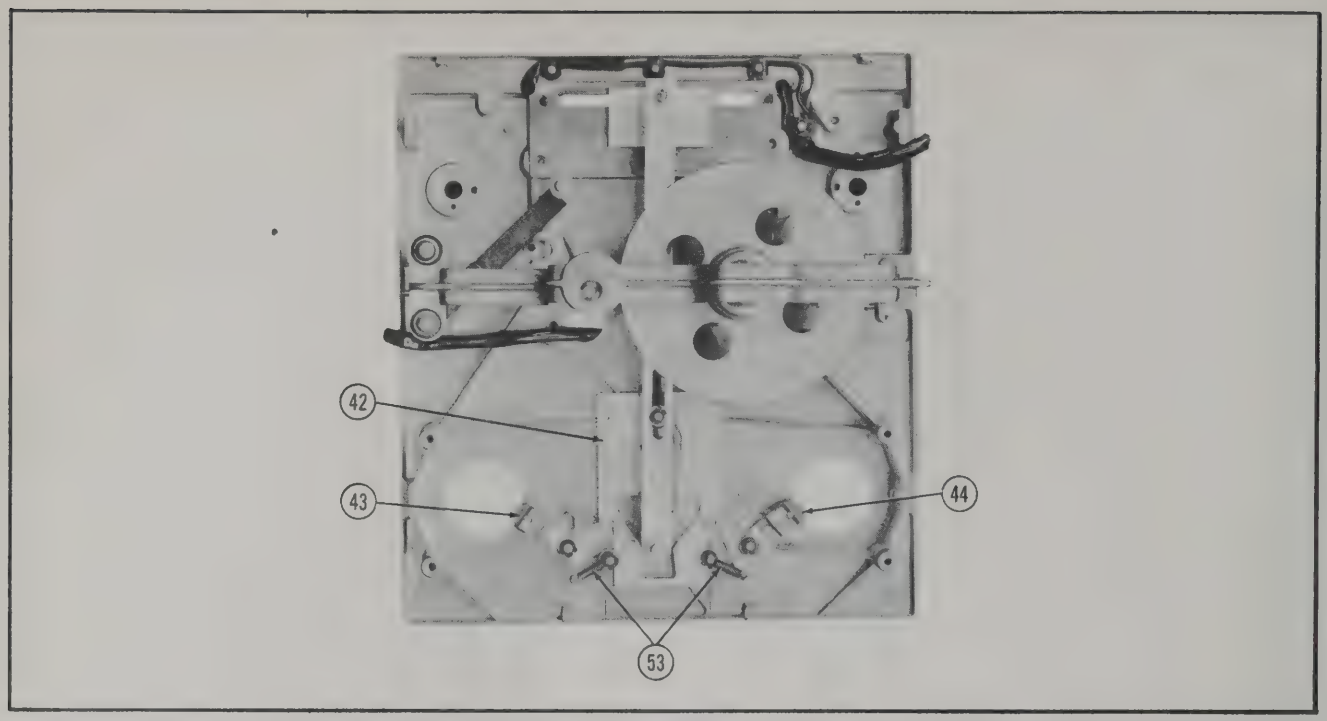


Figure 4

and the recorded signal will be heard on the headphones but not on the internal speaker.

A. Headphones of the crystal, high impedance type are best plugged into the "External Amplifier" jack, but the recorded signal will also be heard through the built-in speaker.

To Use External Speaker-

Any speaker of the permanent magnet type, having a voice coil impedance of from 3.2 to 16 ohms may be used. Connect the spring clips of the patch cord to the voice coil terminals on the external speaker. Insert the phone plug into the "External Speaker" jack. This automatically disconnects the built-in speaker of the recorder.

To Use An External Amplifier-

Should additional power be desired, connect the patch cord between the "External Amplifier" jack and any high impedance Radio or Phono input of an external amplifier.

MECHANICAL FUNCTIONS

Drive Mechanism-

The drive mechanism consists of the following:

1. The drive motor (59). The drive motor is used to drive the flywheel and capstan assembly (37), and the reeling mechanisms. A fan is attached to the drive motor shaft to cool the motor.

2. Rubber belts (38), (51), and (52). These belts are used to couple the motor pulley, which is secured to the motor shaft, to the flywheel (37) and to the reeling mechanisms. Belt (38) drives the flywheel and belt (51) drives the reels in the Fast Forward and Fast Rewind positions. Belt (52) is the takeup belt.

3. The capstan. The capstan is attached to a balanced flywheel (37) and drives the tape at a constant rate of speed. The top capstan bearing is of the "Oilite" type and the bottom one is the rounded end of the capstan shaft which serves as a thrust bearing.

4. The pressure pads (5) and capstan roller (10). The pressure pads and capstan roller are assembled on the capstan pressure plate (7) and capstan roller plate (11). When shift knob (1) is placed in either the "Play" or "Record" position, capstan roller (10) and pressure pads (5) press the tape against the capstan and play-record-erase head (4).

5. Speed Change Mechanism. The speed change mechanism consists of the speed change lever (34), flywheel and capstan (37), and speed change cam (32). Speed change lever (34) is mounted in such a manner that when speed change cam (32) is actuated the speed change lever (34) is pivoted up or down. This, in turn, causes the flywheel and capstan assembly (37) to move up or down. When the capstan is in the "Up" position, the large capstan surface rides against the capstan roller (10) and drives the tape at a constant speed of 7 1/2 inches per second. When the capstan is in the "Down" position, the small capstan surface rides against the capstan roller (10), driving the tape at 3 3/4 inches per second.

6. Fast Forward. When shift knob (1) is placed in the "Fast Forward" position:

A. Control lever (19) actuates brake cam slide (42), which, in turn, releases both brakes (43 and 44).

B. Control lever (19) moves the spindle control plate (64) to the left. The right hand end of control plate (64) rides up the right hand spindle cam (56) and raises the takeup spindle pulley (50) into contact with the felt disc on the takeup spindle spacer (49). The felt disc acts as a friction clutch

and is now in a position to drive the takeup reel.

C. The left end of spindle control plate (64) rides down the left spindle cam (56) and permits the supply spindle pulley (48) to drop away from the felt disc on the supply spindle spacer (47). This action permits the supply reel to be turned freely.

D. The takeup belt (52), which is driven by drive motor (59), drives the takeup reel at a high rate of speed.

7. Fast Rewind. When shift knob (1) is placed in the "Fast Rewind" position:

A. Control lever (19) actuates brake cam slide (42), which, in turn, releases both brakes (43 and 44).

B. Control lever (19) moves the spindle control plate (64) to the right. The left end of control plate (64) rides up the left spindle cam (56) and raises the supply spindle pulley (48) into contact with the felt disc on the supply spindle spacer (47). The felt disc acts as a friction clutch and is now in a position to drive the supply reel.

C. The right hand end of spindle control plate (64) rides down the right hand spindle cam (56) and permits the takeup spindle pulley (50) to drop away from the felt disc on the takeup spindle spacer (49). This action permits the takeup reel to be turned freely.

D. The drive belt (51), which is driven by the drive motor (59), drives the supply reel at a high rate of speed.

8. Play and Record. When shift knob (1) is placed in either the "Play" or "Record" position:

A. Control lever (19) actuates brake cam slide (42) which releases both brakes (43 and 44). Simultaneously, control lever (19) moves the pressure pads (5) into contact with the tape, and pressure roller (10) into contact with the capstan.

B. When in the "Play" or "Record" position, the friction between the takeup spindle pulley (50) and the felt disc on the takeup spindle spacer (49) is just great enough for the takeup reel to take up the tape fed to it by the capstan.

MECHANICAL ADJUSTMENTS

Head Alignment Adjustment-

It is very important that the play-record head (4) be lined up perfectly with the tape. If it is not, low output, loss of high frequencies, or track overlap may result.

NOTE: The head (4) was aligned and cemented in place at the factory and should not require adjustment unless it becomes faulty and requires replacement.

If necessary, adjust as follows:

1. Obtain an alignment tape on which a constant cycle note has been recorded.

2. Connect an output meter or AC voltmeter across the speaker voice coil. Slightly loosen the adjustment screws, located at the sides of the head. While playing the alignment tape, pivot the head back and forth until maximum amplitude on the output meter is achieved.

Clutch Adjustments-

In general, most of the difficulties that will normally be encountered in the Masco Model 500 tape transport mechanism will be traceable to contamination of belts, pulleys, bearings, and other friction surfaces, due to careless lubrication or to the gradual accumulation of dirt and other foreign material to be expected over a reasonable length of time. Correction of these difficulties will usually be a matter of careful disassembly and cleaning, rather than readjustment of the mechanism. The normal torques (and hence, tape tension) in this mechanism are fixed at time of manufacture and should require no further adjustment. Since the measurement of these torques will frequently provide a rapid means for isolating the source of mechanical troubles, their values and the procedures for measuring them are given in the following section.

The measurement of torques requires the following equipment:

1. A light movement 0 - 8 oz. spring scale.

2. A measuring hub. A standard RTMA plastic reel may be used. If the hub diameter is exactly 2 inches, the spring scale will read directly in ounce/inches. Reels with smaller hubs can be brought up to the 2-inch diameter by winding on sufficient tape. If a reel of greater than 2-inch hub diameter is used, multiply the spring scale by the hub radius to obtain the ounce/inch reading.

3. A piece of string, approximately 30 inches long, with a loop tied in one end.

Torques measured on the driven turntable in any mode, (i. e. the turntable on which the tape is being wound) are a measure of takeup tension. Torques measured on the turntable from which the tape is pulled in any mode are a measure of holdback tension.

To measure takeup tension, place the measuring hub on the driven turntable. Wind a few turns of string around the hub in the direction of normal tape wrap, and attach the spring scale to the loop at the end. Start the machine in the appropriate mode and note the reading on the spring scale.

To measure holdback tension in the "Play" or "Record" position, place the measuring hub on the supply spindle. Wind the string on fully in the direction of normal tape wrap, and attach the spring scale. Place shift knob (1) in the "Play" or "Record" position but do not turn the machine "On". Pull the scale slowly in the direction in which tape is normally pulled from this reel, taking the reading while the scale is in steady motion.

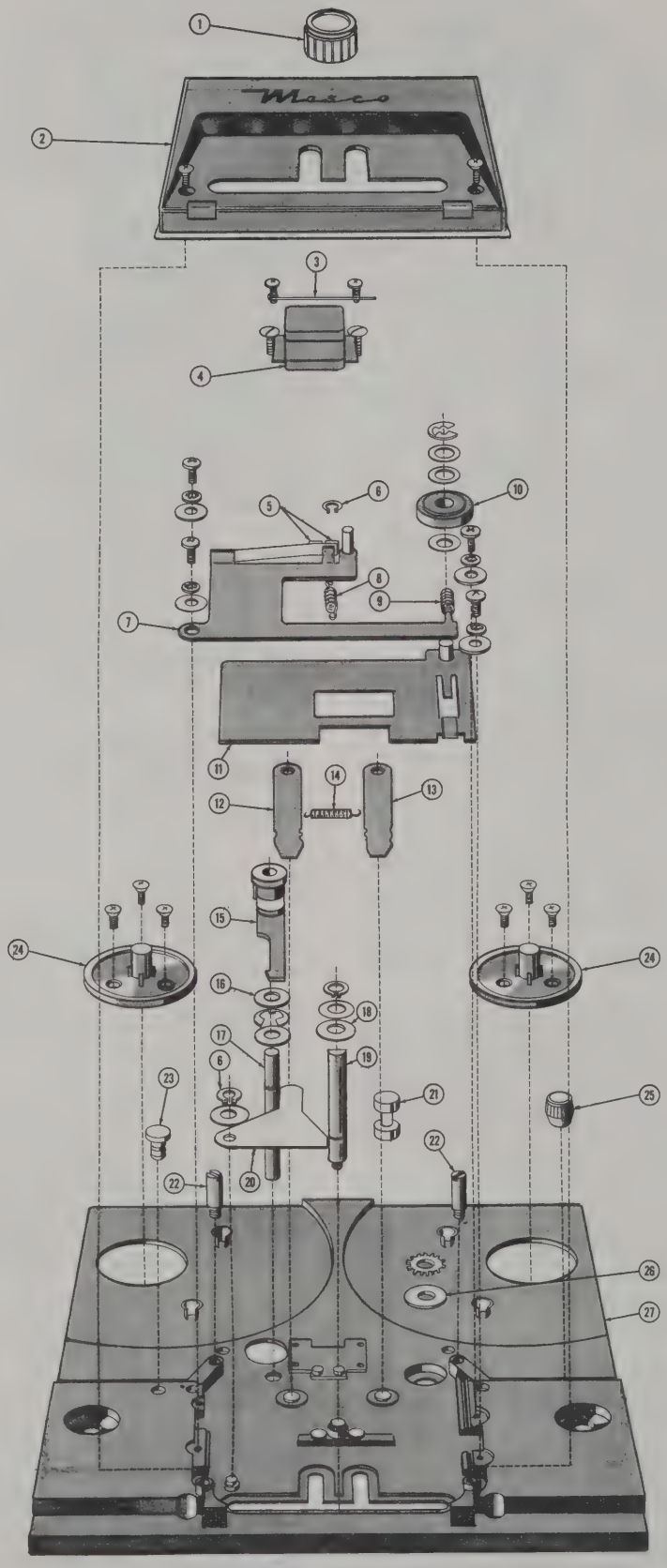


FIGURE 5A. EXPLODED VIEW OF PARTS ABOVE BASEPLATE.

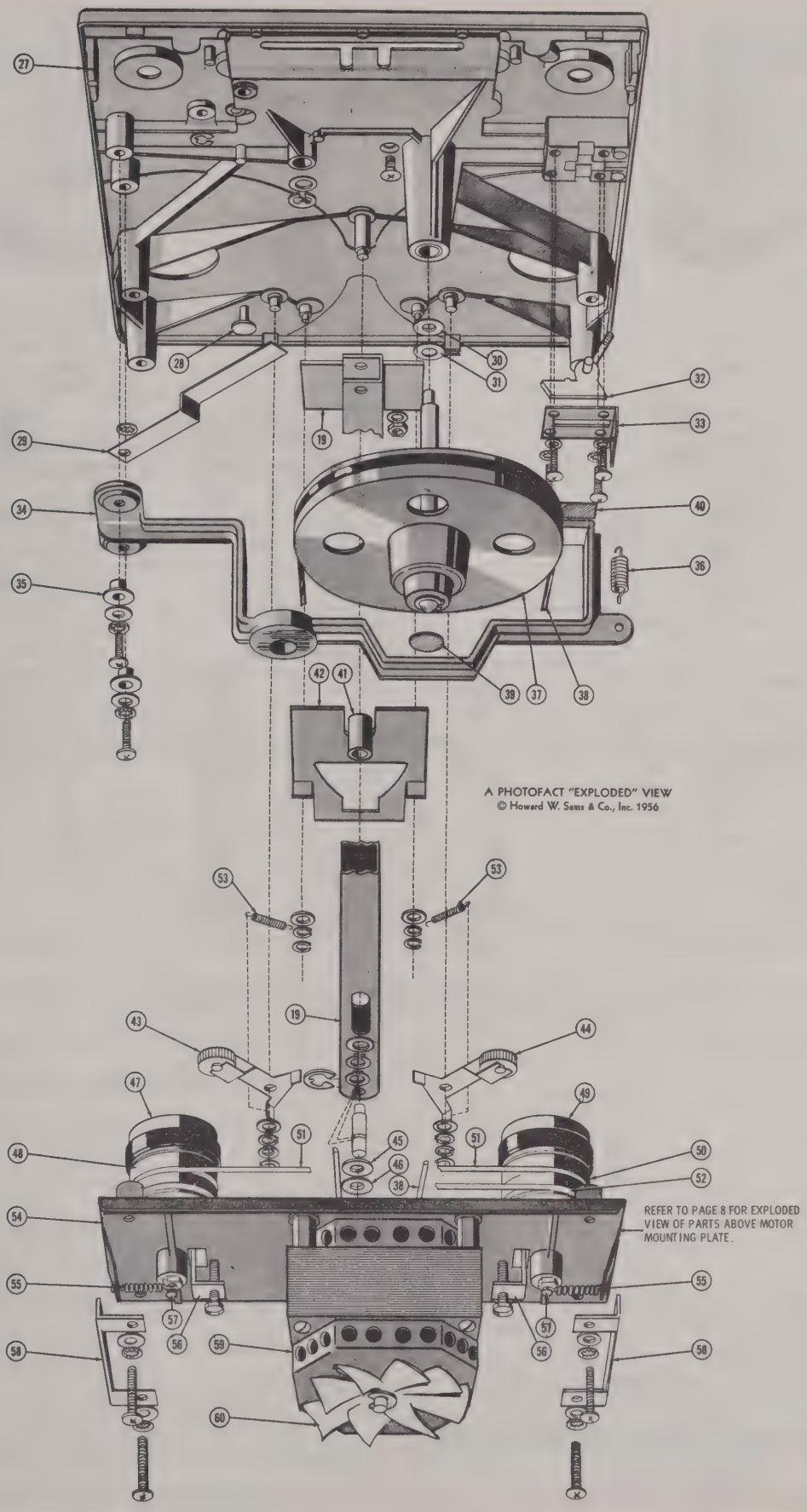
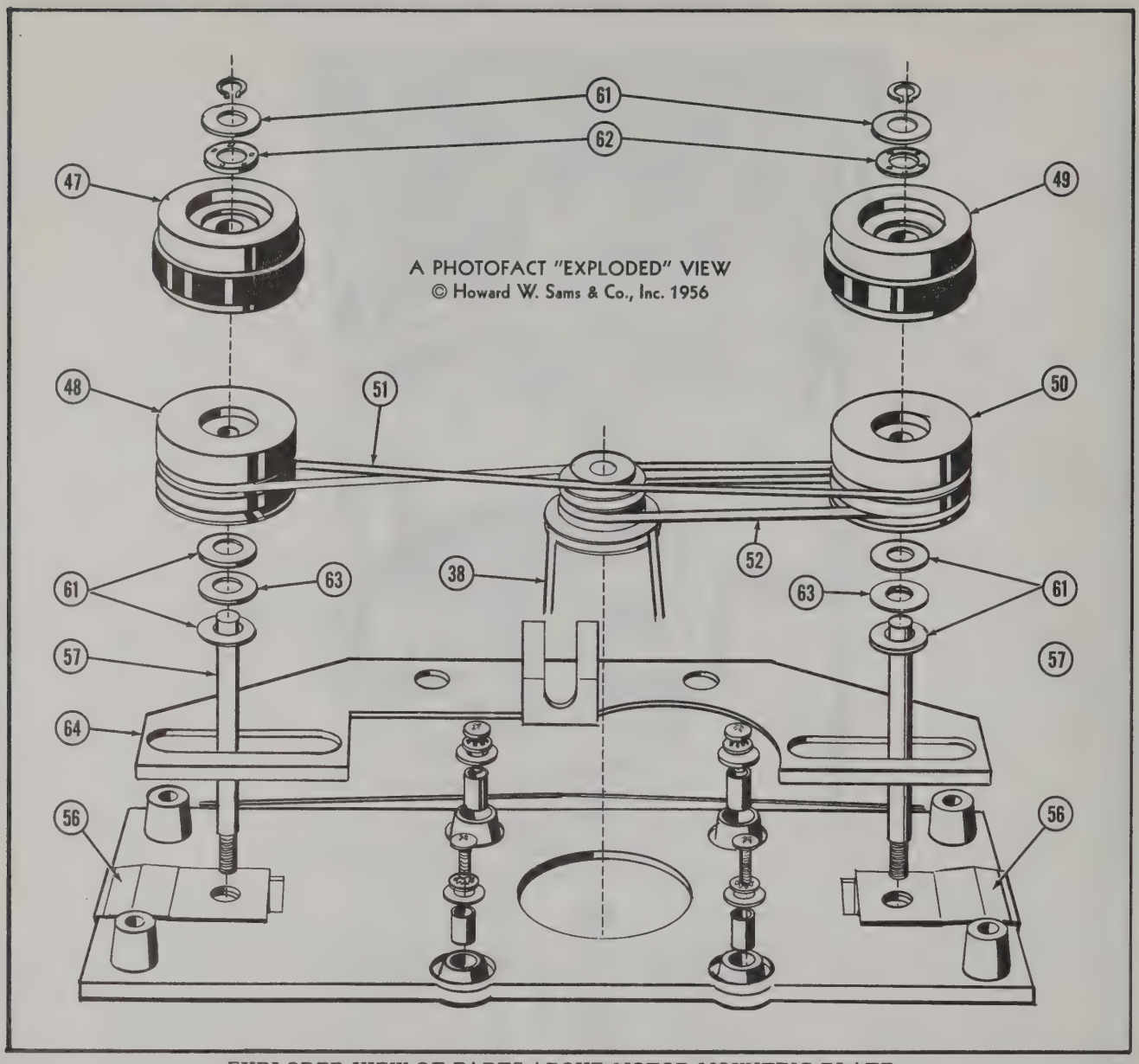


FIGURE 5B. EXPLODED VIEW OF PARTS BELOW BASEPLATE.



EXPLODED VIEW OF PARTS ABOVE MOTOR MOUNTING PLATE.

Normal torques are as follows:

Takeup Reel-

Fast Forward - - - - - - - - - - - - - - - - - 3 1/2 oz.
Play/Record - - - - - - - - - - - - - - - - - 1 oz.

Supply Reel-

Rewind - 3 1/2 oz.
Play/Record - - - - - - - - - - - - - - - - - 1/2 oz.

Should any adjustments be necessary, these may be made by means of the adjustment screws on the spindle cam assemblies (56).

TROUBLES AND PROBABLE CAUSES

Tape Fails To Wind On Takeup Reel During Record Or Playback-

1. Takeup belt (52) slipping or broken.

2. Takeup clutch not adjusted properly. Check adjustment as described under "Clutch Adjustments".

3. Capstan roller spring (9) broken or missing.

4. Drive belt (38) slipping or missing.

5. Spindle cam spring (55) broken or missing.

No Fast Forward-

1. Takeup clutch not adjusted properly. Check adjustment as described under "Clutch Adjustments."

2. Spindle cam spring (55) broken or missing.

3. Takeup belt (52) slipping or broken.

No Fast Rewind-

1. Rewind clutch not adjusted properly. Check adjustment as described under "Clutch Adjustments".

2. Spindle cam spring (55) broken or missing.

3. Takeup belt (52) or drive belt (51) slipping or broken.

Speed Variation — "Wow"-

1. Check the capstan shaft, capstan roller (10), capstan drive belt (38), takeup belt (52), flywheel (37), and the motor pulley for oil or grease. If necessary, clean these parts with alcohol.

2. Check all rotating parts for binding. If parts are found that bind due to dirt or lack of lubrication, disassemble, clean, and lubricate as described under "Lubrication".

CLEANING

The play-record-erase head (4), capstan, and capstan roller (10) are subject to an accumulation of tape coating oxide which is worn off the tape as it passes these parts. To assure optimum performance, this accumulation should be periodically removed with alcohol on a soft cloth.

LUBRICATION

Lubricants applied at time of manufacture are sufficient to last for a long period of time, but in case parts are replaced or approximately once a year, lubricate as follows:

Apply S.A.E. #5 Motor oil to:

1. Top capstan bearing. Place one drop of oil on top bearing. Caution: Be sure no oil is on the portion of capstan extending above baseplate.

2. Top and bottom motor bearing. Place one drop of oil on each bearing and run the motor for a few minutes. Wipe away excess oil.

3. Both spindle bearings (62). Remove the spindle head assemblies (24) and place two drops of oil on each bearing.

Apply "Lubriplate" to the following:

1. The bearing surface on the bottom of flywheel (37).

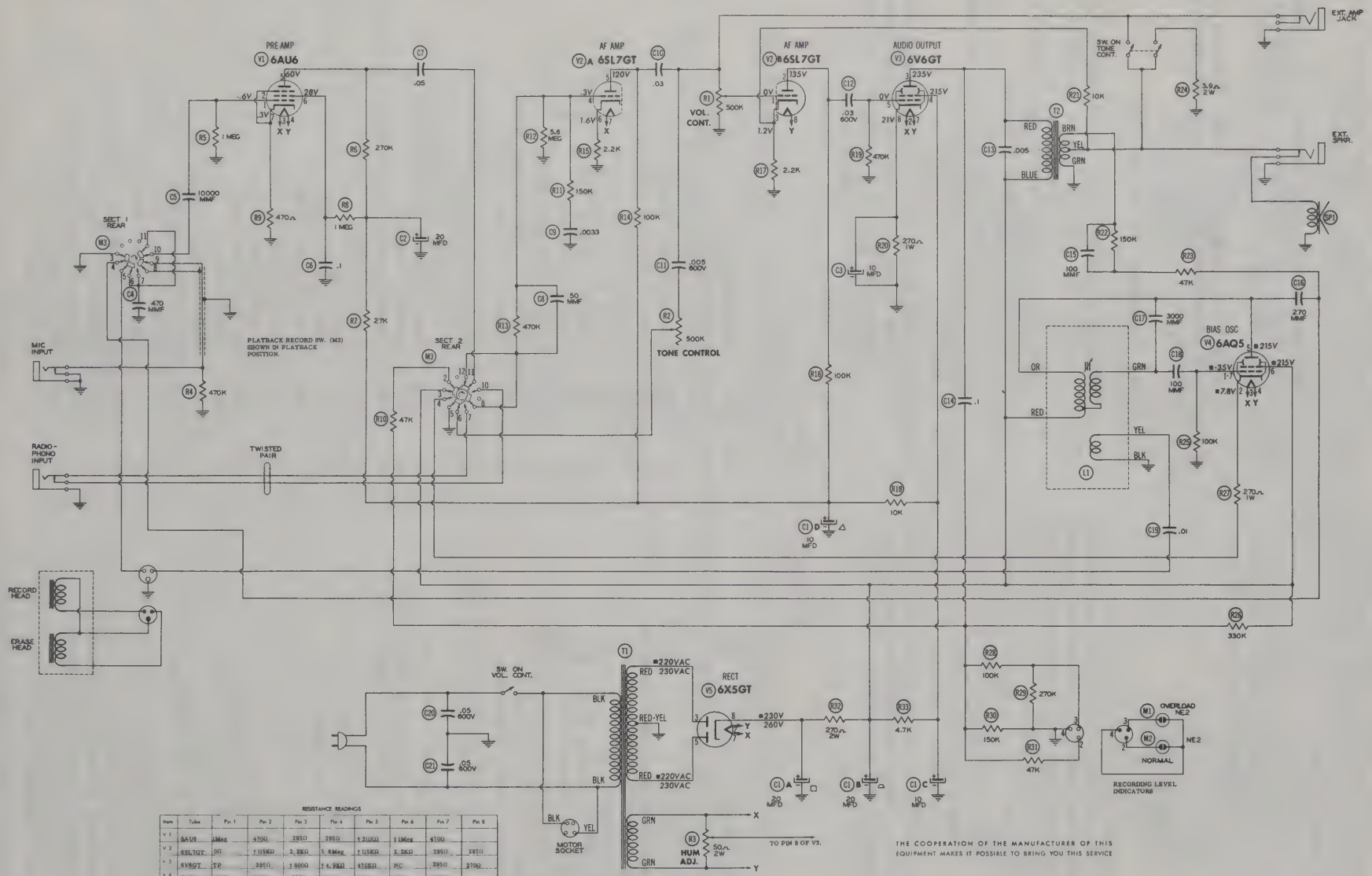
2. Apply a thin film on the cam plate (40) at the point where the speed change cam (32) rides.

3. Apply a thin film to the pivot points and sliding surfaces of all other cams and levers.

CAUTION: Oil and grease must be kept off all rubber belts and pulley surfaces. If any such parts should become contaminated, clean immediately with alcohol.

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
1	1376	Shift Knob	34	1761	Speed Change Lever
2	1375	Front Cover	35	1768	Speed Change Spacer
3	1405	Record Head Retaining Spring	36	1774	Speed Change Spring
4	1816	Record Head Assembly	37	1818	Flywheel Assy.
5	1487	Head Pad	38	1401	Drive Belt
6		Truarc Retaining Ring	39	1772	Flywheel Fibre Plate
7	1819	Capstan Pressure Plate Assy.	40	1771	Cam Fibre Plate
8	1525	Capstan Roller Return Spring	41	1501	Control Lever Bushing
9	1491	Capstan Roller Spring	42	1323	Brake Cam Slide
10	1310	Capstan Roller Assembly	43	1518	Brake Lever Assy. (left)
11	1822	Capstan Roller and Mtg. Plate Assy.	44	1517	Brake Lever Assy. (right)
12	1486	Latch Plate	45	1514	Spindle Felt Washer
13	1486	Latch Plate	46	1523	Fibre Thrust Washer
14	1320	Latch Spring	47	1512	Supply Spindle Spacer Assy.
15	1826	Tape Guide Arm and Cover Assy.	48	1379	Spindle Pulley
16	1523	Spindle Thrust Fibre Washer	49	1983	Takeup Spindle Spacer Assy.
17	1519	Tape Guide Shaft	50	1379	Spindle Pulley
18	1319	Shift Handle Washer	51	1401	Drive Belt
19	1823	Control Lever Assy.	52	1403	Takeup-Drive Belt
20	1342	Record Switch Actuator	53	1506	Brake Lever Spring
21	1296	Tape Guide	54	1311	Motor Mounting Plate
22	1773	Tape Guide Stud	55	1495	Spindle Cam Spring
23	1719	Record Lock Button	56	1499	Spindle Cam Assy.
24	1817	Spindle Head Assy.	57	1292	Spindle Shaft
25	1767	Speed Change Knob	58	1999	Cam Retaining Plate
26	1524	Flywheel Thrust Felt Washer	59	1498	Drive Motor Assy.
27	1824	Top Plate Assy.	60	1611	Motor Fan
28	1724	Record Lock Pin	61	1523	Spindle Fibre Washer
29	1723	Record Lock Spring	62	1515	Spindle Bearing
30	1521	Flywheel Thrust Fibre Washer	63	1514	Spindle Felt Washer
31	1524	Flywheel Thrust Felt Washer	64	1299	Spindle Control Plate
32	1762	Speed Change Cam	65	1482	Motor Mount Spacer
33	1770	Cam Retaining Plate	66	1483	Motor Shock Grommet



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	6AU8	1Meg	470Ω	295Ω	295Ω	† 311KΩ	† 1Meg	470Ω	
V 2	6SL7GT	0Ω	† 115KΩ	2. 2KΩ	5. 6Meg	† 115KΩ	2. 2KΩ	295Ω	295Ω
V 3	6V6GT	TP	295Ω	† 600Ω	† 4. 9KΩ	470KΩ	NC	295Ω	270Ω
V 4	6AQ5	100KΩ	■270Ω	295Ω	295Ω	250Ω	270Ω	100KΩ	
V 5	6X5GT	NC	295Ω	325Ω	TP	325Ω	NC	295Ω	50KΩ

ALL MEASUREMENTS TAKEN IN PLAY POSITION UNLESS DESIGNATED OTHERWISE.
■ MEASURED IN RECORD POSITION
NC – NO CONNECTION
TP – TIE POINT
† MEASURED FROM PIN 8 OF V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MASCO PART No.	STANDARD REPLACEMENT	
V1	Preamplifier	6AU6	6AU6	
V2	AF Amplifier	6SL7GT	6SL7GT	
V3	Audio Output	6V6GT	6V6GT	
V4	Bias Oscillator	6AQ5	6AQ5	
V5	Rectifier	6X5GT	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	450		AFH4-19-10	D012	FP474.5	TM-4053	Q-060	TVL-4826
B	▲20	450			BR1045				
C	10	450							
D	▲10	450							
C2	20	250		PRS250V20	BR2035	TC55	TD-20-250	FM-2520	TVA-1508
C3	10	50		PRS50V10	BR105	TC32	TD-10-50	MMT-0510	TVA-1304

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	470	500		SI470	D6-471	5W5T47	GP2K-471	MC245	1FM-347	
C5	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	.1	200		P288N-1	DF-104	CUB2P1		PT401	2TM-P1	
C7	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C8	50	500		SI50	D6-500	5W5Q50	GP1K-500	MC225	1FM-45	
C9	.0033	400		SI3300	D6-332	CUB6D33	GP2-333-332	PT6233	6TM-D33	
C10	.03	400		BPD-03	DF-303	CUB6S3		PT613	6TM-S3	
C11	.005	600		SI5000	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C12	.03	600		BPD-03	DF-303	CUB6S3		PT613	6TM-S3	
C13	.005	400		SI5000	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C14	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	
C15	100			N750-DI100	TCN-100	N042	N750L-101	NT-531	5TCU-T1	
C16	270	500		SI270	D6-271	5W5T27	GP2K-271	MC241	1FM-327	
C17	3000	500		SI3000	D6-302	1W5D3	GP2-333-302	MC461	1FM-23	
C18	100	500		SI100	D6-101	5W5T1	GP1K-101	MC235	1FM-31	
C19	.01	400		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C20	.05	600		BPD-05	DF-503	CUB6S5		PT615	6TM-S5	
C21	.05	600		BPD-05	DF-503	CUB6S5		PT615	6TM-S5	

CONTROLS

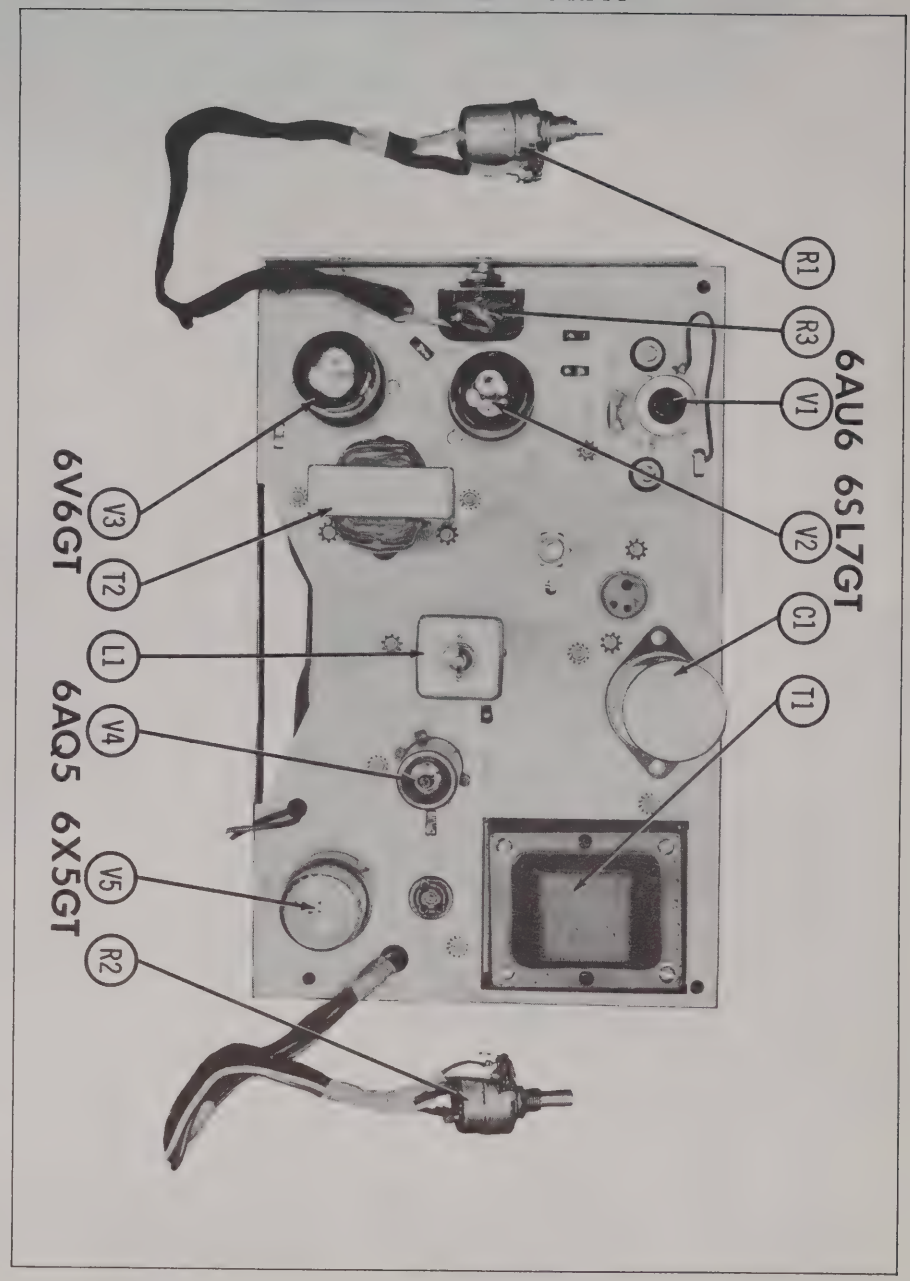
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500KΩ	½		AB-60	A47-500K-Z	Q13-133	U-48	Volume
B	Shaft			AK-3	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R1A
D	Cover			KB-5				Attach to R1C
R2A	500KΩ	½		B-61-S		Q17-133		Tone
B	Switch			Not Req.		76-2		Attach to R2A
R3A	50Ω	2			A43-50		C50P	Hum Adjustment
B	Shaft				FKS-1/4		Not Req.	Attach to R3A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R4	470KΩ	1/2		BTS-470K	
R5	1Meg	1/2		BTS-1Meg	
R6	270KΩ	1/2		BTS-270K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MASCO PART No.	IRC PART No.	
R7	27KΩ	1/2		BTS-27K	
R8	1Meg	1/2		BTS-1Meg	
R9	470Ω	1/2		BTS-470	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MASCO PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R10	47KΩ	1/2		BTS-47K	
R11	150KΩ	1/2		BTS-150K	
R12	5.6Meg	1/2		BTS-5.6Meg	
R13	470KΩ	1/2		BTS-470K	
R14	100KΩ	1/2		BTS-100K	
R15	2200Ω	2		BTS-2200	
R16	100KΩ	1/2		BTS-100K	
R17	2200Ω	2		BTS-2200	
R18	10KΩ	1/2		BTS-10K	
R19	470KΩ	1/2		BTS-470K	
R20	270Ω	1		BTA-270	
R21	10KΩ	1/2		BTS-10K	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA MASCO PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R22	150KΩ	1/2		BTS-150K	
R23	47KΩ	1/2		BTS-47K	
R24	3.9Ω	2			
R25	100KΩ	1/2		BTS-100K	
R26	330KΩ 5%	1/2		BTS-330K 5%	
R27	270Ω	1		BTA-270	
R28	100KΩ	1/2		BTS-100K	
R29	270KΩ	1/2		BTS-270K	
R30	150KΩ	1/2		BTS-150K	
R31	47KΩ	1/2		BTS-47K	
R32	270Ω	2		BTB-270	
R33	4700Ω	1/2		BTS-4700	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA MASCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Bias Osc.	10Ω	8Ω					Tertiary Winding - 10Ω

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA MASCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .27A	470VCT @ .042A	6.3VAC @ 2.15A					P6348		R-4B

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MASCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	4.95KΩ								

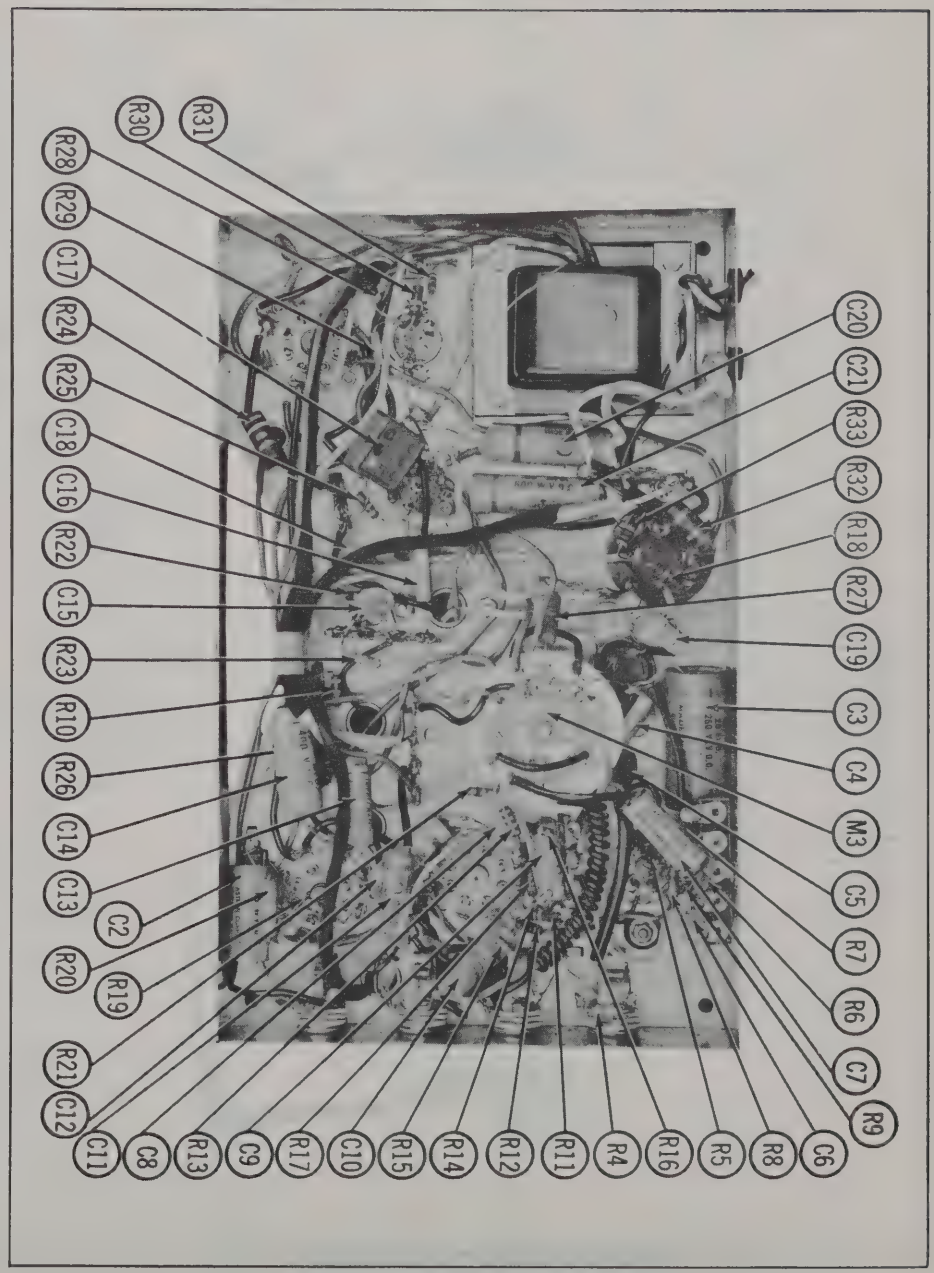
SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA MASCO PART No.	QUAM PART No.	RCA TYPE No.	NOTES
SP1	5" X 7"	PM	3-4Ω		57A15	257S1	

MISCELLANEOUS

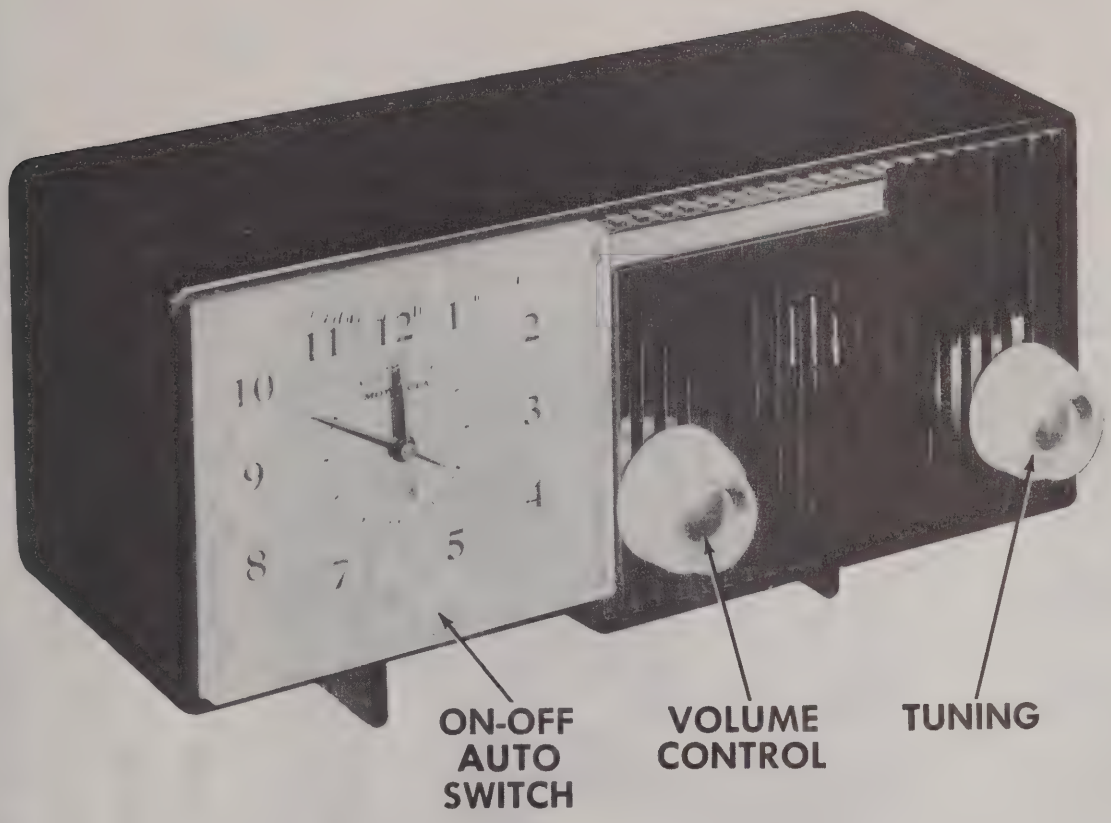
ITEM No.	PART NAME	MASCO PART No.	NOTES
M1	Neon Light		NE-2 or NE-2A (Recording Level)
M2	Neon Light		NE-2 or NE-2A (Recording Level)
M3	Switch	1736	Play-Record (2 Position - Rotary, Wafer Type.)

CHASSIS—BOTTOM VIEW



MOTOROLA MODELS 56CE1, 56CS1, 56CS2, 56CS3, 56CS4 (Ch. HS-490)

MOTOROLA MODELS 56CE1, 56CS1, 56CS2, 56CS3, 56CS4 (Ch. HS-490)



MOTOROLA MODELS 56CE1, 56CS1, 56CS2, 56CS3, 56CS4 (Ch. HS-490)

TRADE NAME	Motorola Models 56CE1, -A, 56CS1, -A, 56CS2, -A, 56CS3, -A, 56CS4, -A (Ch. HS-490)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det. -AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles — RATING .245 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side ground (outer chassis edges).	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil.	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"

PROPERTY OF
L. T. PLANKENSHIP
[illegible] ST.
[illegible] COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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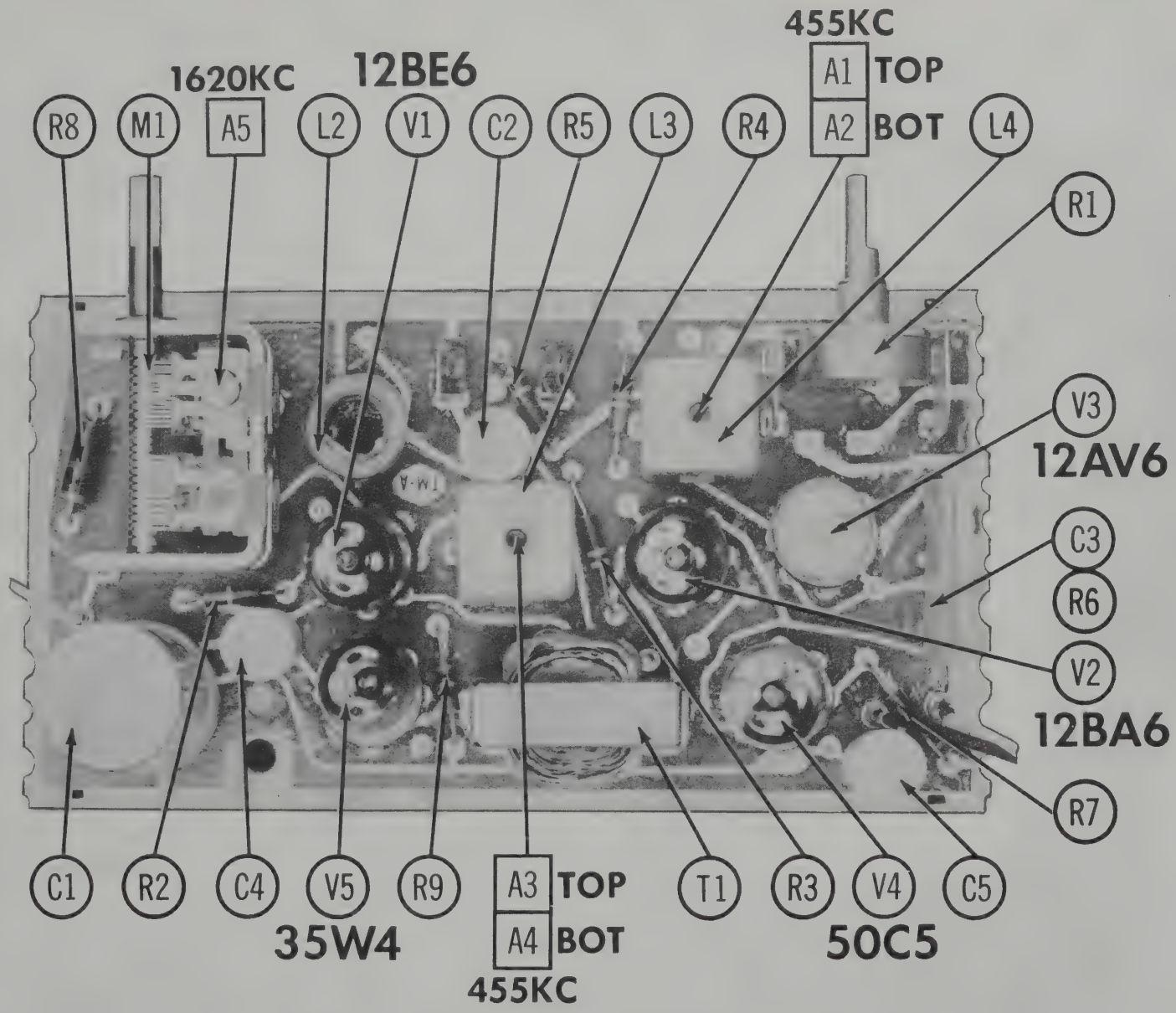


CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT	
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. - AVC - AF Amp.	12AV6	12AV6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	23B632015	AFH2-15	B015	FP213	TM-5030-150	D-065	TVL-2432
B	▲30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200	8B120842	BPD-05	DF-503			PTS415	2SE-S47	
C3A	220									
B	5000									
C	5000		♦21B630180	♦PA-299	♦† PC-158					
D	250									
E										
C4	.03	400	8K122983	BPD-03	DF-303				4SE-S33	
C5	.05	400	8K121268	BPD-05	DF-503			PTS415	4SE-S47	

♦ Items C3A, C3B, C3C, C3D, C3E, R6A, R6B and R6C are combined in one unit. When replacing items separately, C3D and C3E should total 250MMF.
† Reverse leads numbered 5 and 6.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	1Meg	½	18K633692					Volume

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R2	22KΩ	½	6R6028	BTS-22K	
R3	3.3Meg	½	6R2118	BTS-3.3Meg	
R4	100Ω	½	6R6018	BTS-100	
R5	3.3Meg	½	6R2118	BTS-3.3Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R6A	6.8Meg		♦21B630180	BTS-6.8Meg	
B	470KΩ			BTS-470K	
C	470KΩ			BTS-470K	
R7	150Ω	½	6R3992	BTS-150	
R8	1000Ω	1	6K119404	BTA-1000	
R9	27Ω	½	6R5683	BTS-27	

♦ Items R6A, R6B, R6C, C3A, C3B, C3C, C3D, C3E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3-4Ω	25B632025-E	Z1101 ①	A-3025 ①	A-3332 ①	26S58 ①	S-12X ①	① Use Original Channel

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	50C632031	4A07	223S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	4Ω		1V634039				Includes cabinet back
L2	Osc. Coil	1Ω	12Ω	24B631990				
L3	Input IF	15Ω		24K632782				
L4	Output IF	13Ω	13Ω	24K632039	16-6780			

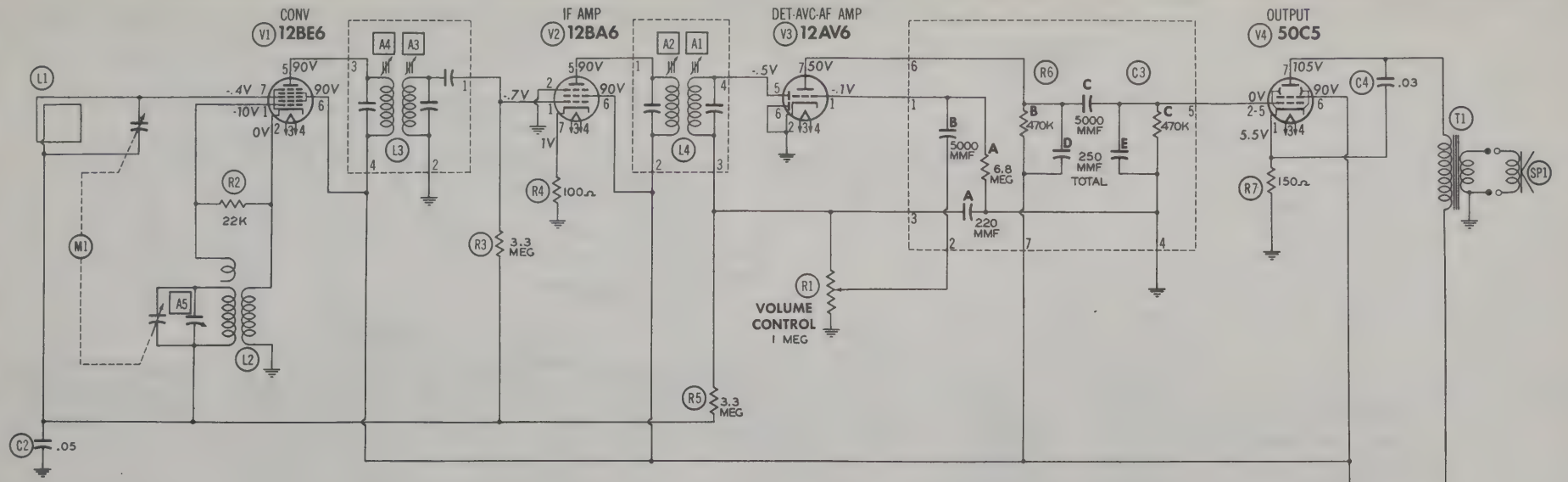
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning cap.	19B632026	2 gang
M2	Clock assy.	72D634214	Model 56CE1
	Clock assy.	72D634215	Models 56CS1, 56CS2, 56CS3, 56CS4
	Clock assy.	72D633648	Model 56CE1-A
	Clock assy.	72D633691	Models 56CS1-A, 56CS2-A, 56CS3-A, 56CS4-A
	Cabinet	1V635138	Model 56CE1
	Cabinet	1V635139	Model 56CS1
	Cabinet	1V635140	Model 56CS2
	Cabinet	1V635141	Model 56CS3
	Cabinet	1V635142	Model 56CS4
	Knob	36K635168	Operation selector - Model 56CE1-A
	Knob	36K634437	Operation selector - Model 56CE1
	Knob	36B633621	Operation selector - Models 56CS1, 56CS2, 56CS3, 56CS4
	Knob	36K633613	Tuning - Model 56CE1
	Knob	36C633612	Tuning - Models 56CS1, 56CS2, 56CS3, 56CS4
	Knob	36K633615	Volume - Model 56CE1
	Knob	36K633614	Volume - Models 56CS1, 56CS2, 56CS3, 56CS4
	Crystal	61K633607	Clock - Model 56CE1
	Crystal	61C633606	Clock - Models 56CS1, 56CS2, 56CS3, 56CS4

SET 317 FOLDER 10

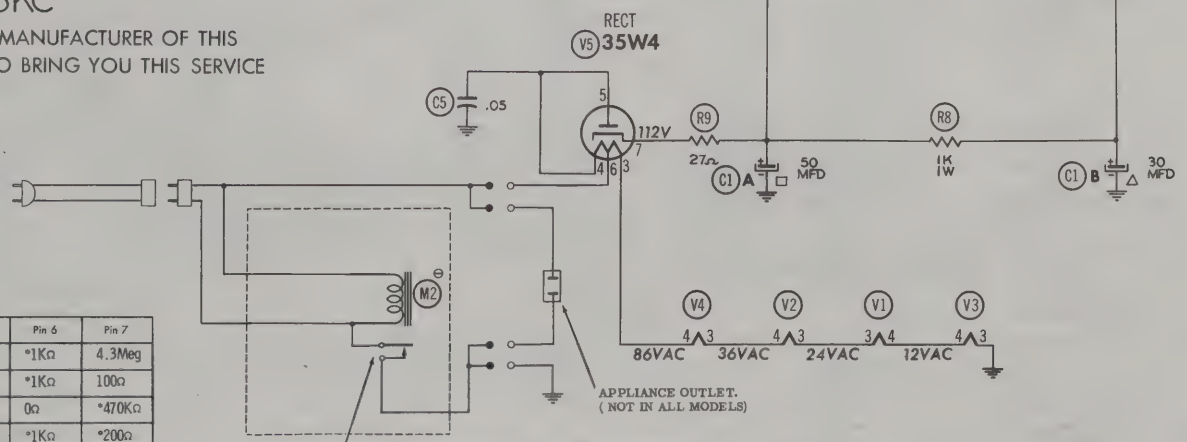
MOTOROLA MODEL 56CE1 (Ch. HS-490)

MOTOROLA MODEL 56CE1 (Ch. HS-490)



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE



THROUGH CAMS AND LINKAGES, ONE SW. PERFORMS ALL FUNCTIONS OF OFF, ON, AUTO, AND SLEEP

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.5Ω	24Ω	12Ω	*1KΩ	*1KΩ	4.3Meg
V 2	12BA6	7.6Meg	0Ω	24Ω	36Ω	*1KΩ	*1KΩ	100Ω
V 3	12AV6	6.8Meg	0Ω	0Ω	12Ω	1Meg	0Ω	*470KΩ
V 4	50C5	150Ω	470KΩ	36Ω	86Ω	470KΩ	*1KΩ	*200Ω
V 5	35W4	NC	NC	86Ω	120Ω	120Ω	115Ω	30KΩ

ALL MEASUREMENTS TAKEN WITH CLOCK DISCONNECTED.

* - MEASURED FROM PIN 7 OF V5.

NC- NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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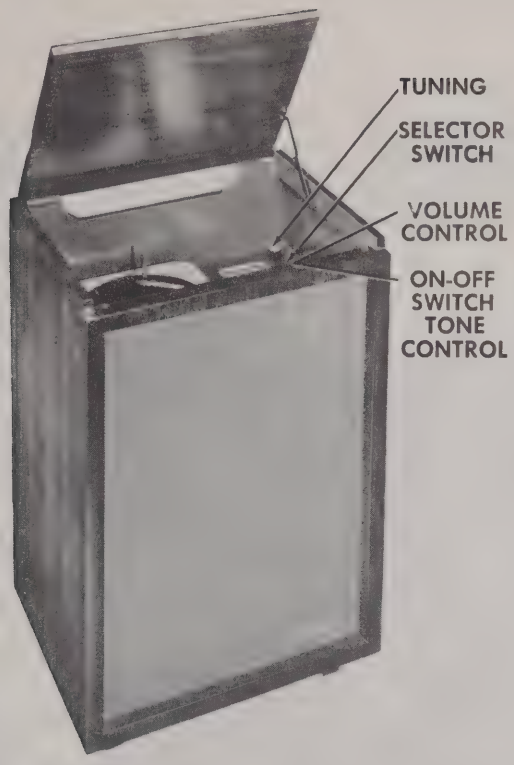
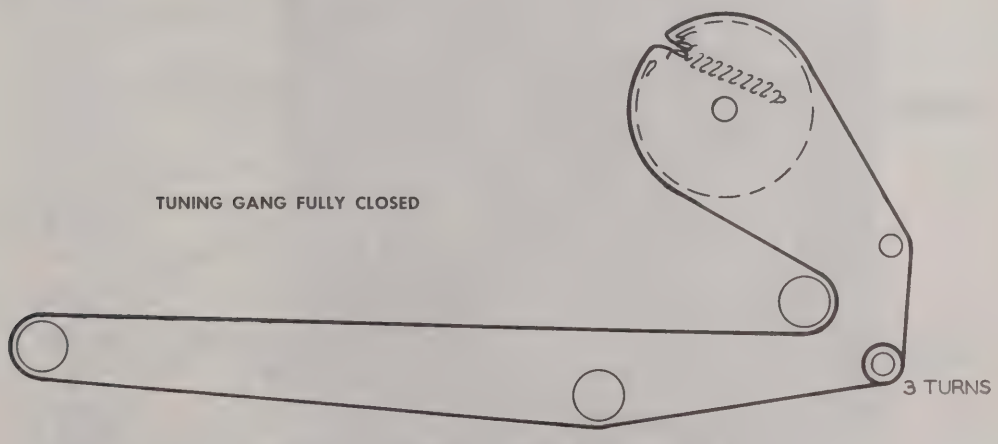


OLYMPIC
MODEL 575

TRADE NAME	Olympic Model 575		
MANUFACTURER	Olympic Radio & Tel. Corp., 34-01 38th Ave., Long Island 1, N. Y.		
TYPE SET	AC Operated FM-AM Receiver With 3 Speed Automatic Record Changer		
TUBES (Seven)	Types 6BJ6 FM RF Amp., 12BE6 Converter, 6BJ6 1st IF Amp., 12AU6 2nd FM IF Amp., 19T8 Ratio Det. -AM Det. -AVC - AF Amp., 35C5 Output, 35W4 Rectifier.		
POWER SUPPLY	110 - 120 Volts AC - 60 Cycles	RATING	.26 Amp. @ 117 Volts AC
TUNING RANGE - BROADCAST	535KC - 1700KC	FREQ. MOD.	88-108MC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT RX4015 - SEE SIMILAR V-M MODEL 954B-PHOTOFACT SET #302 - FOLDER #12.

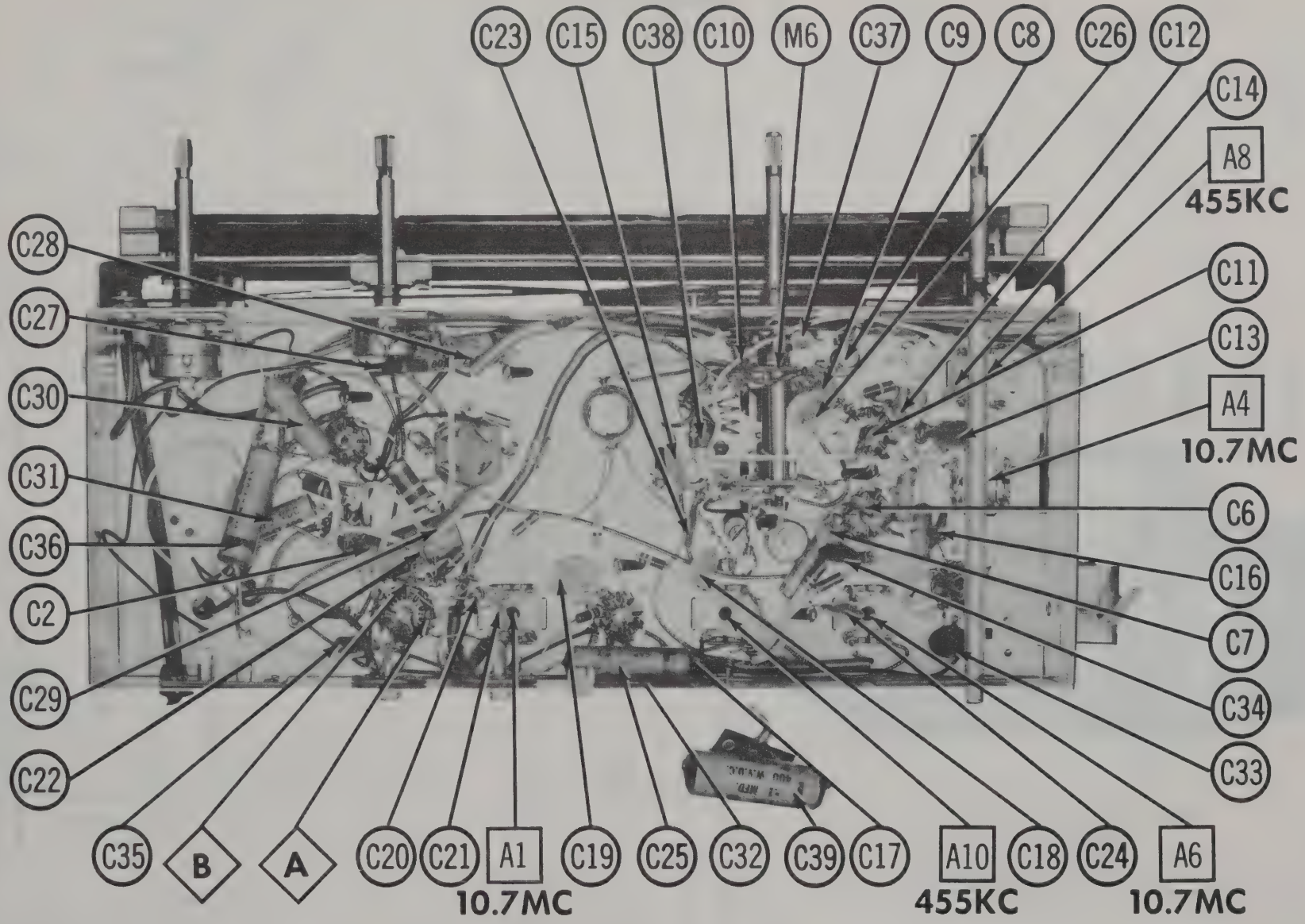


DIAL CORD STRINGING

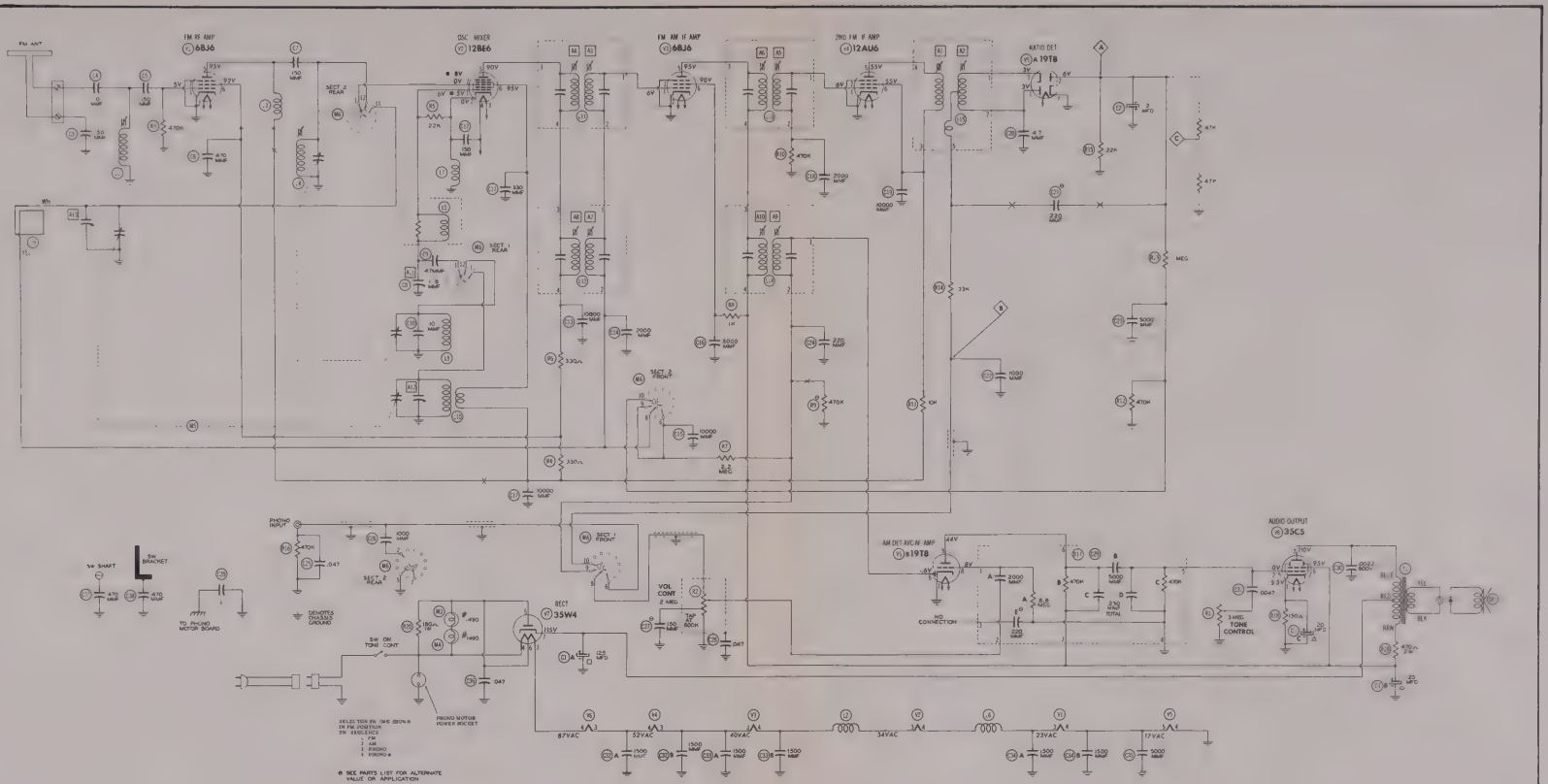
PROPERTY OF
L. F. BLANKENSHIP
3[illegible] MEADE ST.
DENVER, COLORADO

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1956 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under international Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



RESISTANCE READINGS

Point	Tubes	Pin	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
*	6BJ6	470KΩ	0Ω	250	190	*500Ω	*800Ω	0Ω		
* 3	12BE6	22KΩ	2Ω	38Ω	28Ω	*1.2KΩ	*500Ω	W/ SW in ID		
* 2	6BJ6	#1 3MeV #2 330KΩ	2Ω	45Ω	34Ω	*500Ω	1.5K Ω	0Ω		
* 4	12AU6	470KΩ	0Ω	45Ω	51Ω	*10.5KΩ	*10.5KΩ	0Ω		
* 5	19T8	2Meg	22KΩ	2Meg	0Ω	19Ω	470KΩ	0Ω	6.5Meg	*470KΩ
* 6	35C5	250Ω	470KΩ	230	220	470KΩ	*500Ω	*220Ω		
* 8	35W4	TP	NC	90Ω	1.2KΩ	128Ω	128Ω	128Ω		

ALL MEASUREMENTS TAKEN IN THE POSITION UNLESS DESIGNATED OTHERWISE.
* - MEASURED FROM PIN 7 OF V7
● - MEASURED IN AM POSITION
TP - TIE POINT
NC NO CONNECTION

AM IF=455KC
FM IF= 10.7MC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured AM tuning gang in maximum capacitance position.
4. Some of the voltages measured will vary slightly with variations in component values and tube characteristics.
5. Values of ±10% in voltage and resistance readings may be expected as tolerances, no values applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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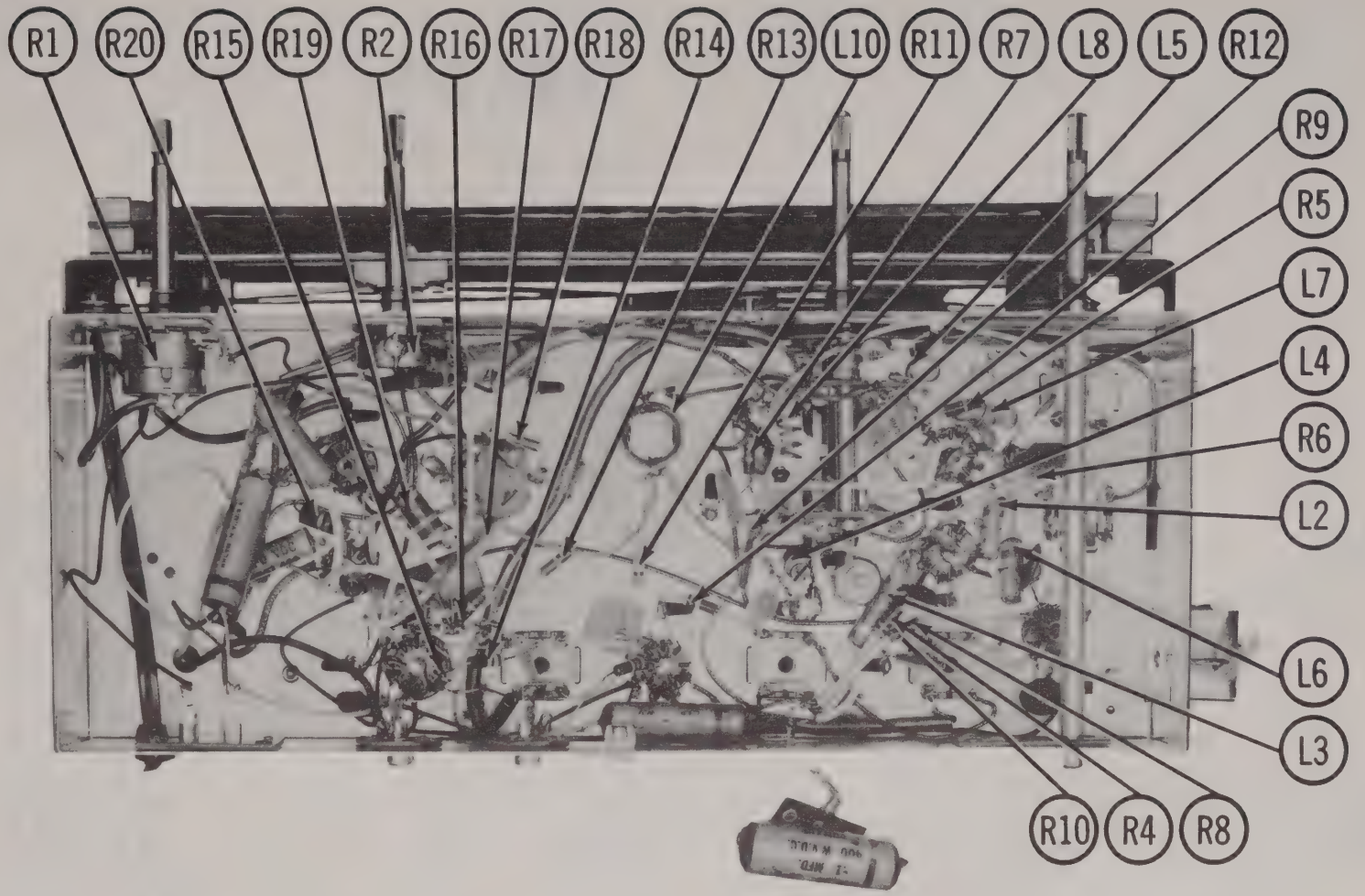
317-11



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and chassis.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

FM-AM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

*Loop consists of 2 turns of wire around V2 (12BE6).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 12AU6 (V4). Low side to chassis.	10.7MC (Unmod.).	FM	Tuning gang fully open.	DC probe to point Ⓐ. Common to point Ⓒ.	A1	Adjust for maximum deflection
2.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A2	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
3.	Direct	High side to loop*. Low side to chassis.	"	"	"	DC probe to point Ⓐ. Common to point Ⓒ.	A3, A4, A5, A6	Adjust for maximum deflection.
4.	.1MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	455KC (400∿ mod.)	AM	"	Across voice coil.	A7, A8 A9, A10	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection. * Loop consists of 2 turns of wire around V2 (12BE6).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1.	.1MFD	High side to pin 1 (grid) of 12AU6 (V4). Low side to chassis.	10.7MC (450KC swp)	FM	Tuning gang fully open.	Vert. amp. to point Ⓐ. Low side to point Ⓒ.	A1	Disconnect stabilizing capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	"	Vert. amp. to point Ⓑ. Low side to point Ⓒ.	A2	Connect (temporarily) stabilizing capacitor (C2). Adjust so that 10.7MC occurs center of crossover lines similar to Fig. 2.
3.	"	High side to loop*. Low side to chassis.	"	"	"	Vert. amp. to point Ⓐ. Low side to point Ⓒ.	A3, A4 A5, A6	Disconnect stabilizing capacitor (C2). Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Reconnect stabilizing capacitor (C2). Proceed with step 5.

FM-AM RF ALIGNMENT

Coils L1, L4, L7, are preset at factory and realignment is not necessary unless coil have been tampered with or replaced.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	2 150Ω carbon resistors.	Across FM antenna terminals with 150Ω in each lead.	88MC	FM	88MC	Across voice coil.	L7	Adjust for maximum deflection by expanding or compressing coil turns.
6.	"	"	108MC	"	108MC	"	A11	Adjust for maximum deflection. Repeat steps 5 & 6 until oscillator range is 88 to 108MC.
7.	"	"	98MC	"	98MC	"	L4, L1	Adjust for maximum deflection by expanding or compressing coil turns.
8.		Loop (radiated)	1500KC	AM	1500KC	"	A12, A13	Adjust for maximum deflection.
9.		"	600KC	"	Tune to 600KC signal.	"		Check for tracking.

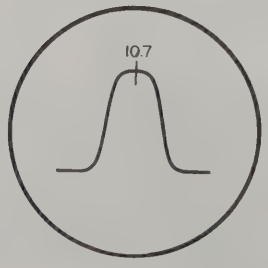


FIG. 1

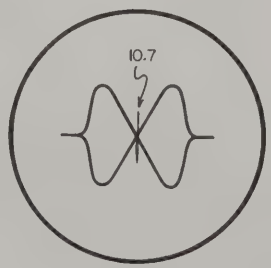


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		OLYMPIC PART No.	STANDARD REPLACEMENT	
V1	FM RF Amplifier	6BJ6	6BJ6	
V2	Converter	12BE6	12BE6	
V3	1st FM-AM IF Amplifier	6BJ6	6BJ6	
V4	2nd FM IF Amplifier	12AU6	12AU6	
V5	Ratio Det. -AM Det. -AVC - AF Amplifier	19T8	19T8	
V6	Output	35C5	35C5	
V7	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	OLYMPIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■125	150	CO-4032	AFH3-13-30	C062	FP311.9	TM-1208040-150	T-065	TVL-3448
B	▲125	150			BR6015		TD-25-25	FM-0225	TVA-1205
C	▲20	25							
C2	2	50	CO-4033	PRS50V2	BBR2-50	TC302	TD-2-50	MMT-0505	TVA-1301

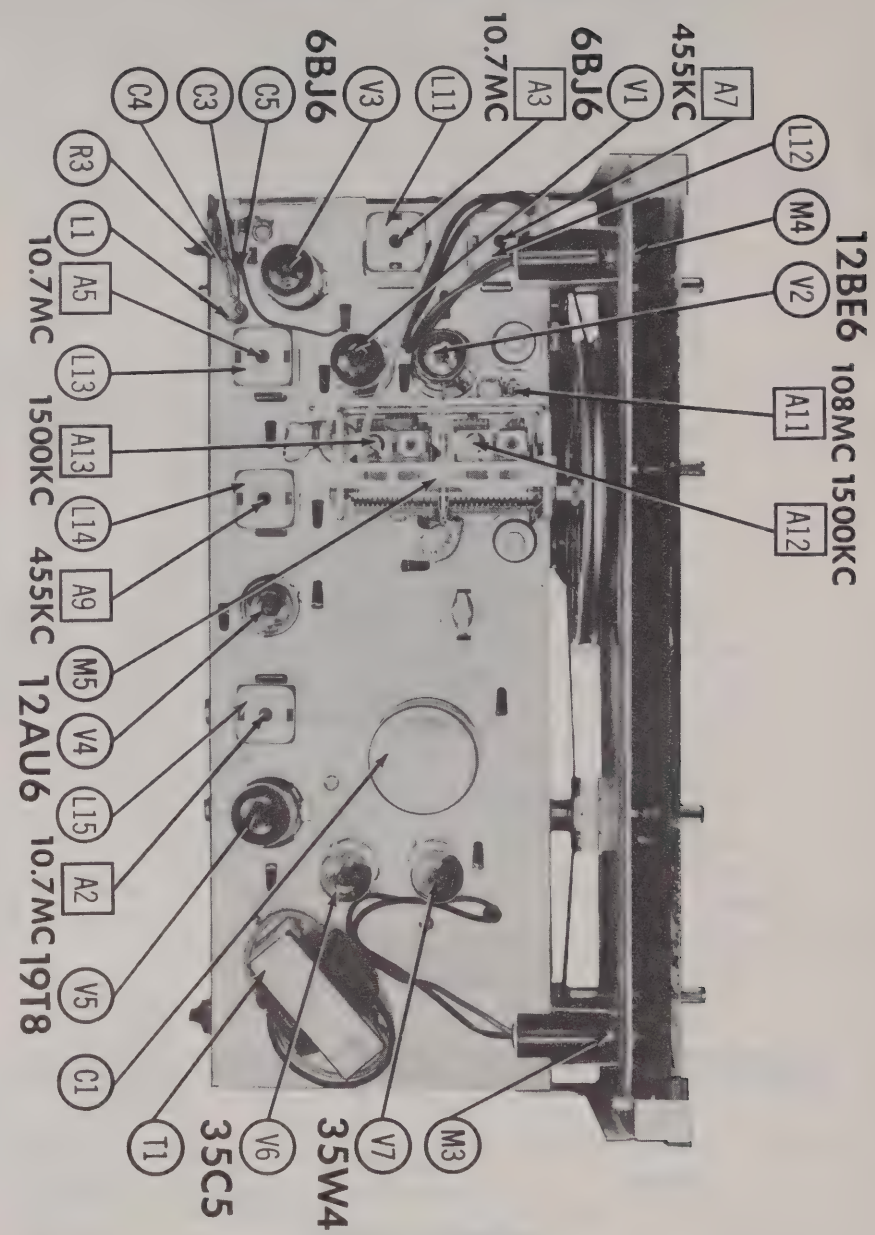
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	OLYMPIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C3	150		CCD151X	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C4	10		CCD100K	NPO-DI10	TCZ-10	Z018	NPOA-100	ZT-541	5TCC-Q1	
C5	150		CCD151X	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C6	470		CCD471X	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C7	150		CCD151X	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C8	1-8		CT1036				532-10			
C9	47		CCD470K	NPO-DI47	TCZ-47	Z033	NPO-338-470	ZT-5447	5TCC-Q47	
C10	10		CCD100K	NPO-DI10	TCZ-10	Z018	NPOA-100	ZT-541	5TCC-Q1	
C11	330		CCD331M	BPD-00033	DD-331	G056	811-331	UC-5333	5GA-T33	
C12	150		CCD151X	BPD-00015	DD-151	G046	811-151	UC-5315	5GA-T15	
C13	10000		CCD103X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C14	2000		CCD202X	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C15	10000		CCD103X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C16	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C17	10000		CCD103X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C18	2000		CCD202X	BPD-002	DD-202	K072	801-002	DC-522	5HK-D2	
C19	10000		CCD103X	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C20	4.7		CO-1083	NPO-SI4.7	TCZ-4R7	TZ07	NPOA-4R7	ZT-5547	5TCCB-V47	
C21	220		CCD221M	BPD-00022	DD-221	G051	811-221	UC-5322	5GA-T22	Note 1
C22	1000		CCD102M	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C23	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C24	220		CCD221M	BPD-00022	DD-221	G051	811-221	UC-5322	5GA-T22	
C25	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C26	1000		CCD102M	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C27	150	500		SI150	D6-151	5W5T15	811-151	MC236	1FM-315	Note 1
C28	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C29A	2000									
B	5000									
C	250		♦	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
D										
E	220									Note 1
C30	.0022	600	CO-H-4202	SI2200	D6-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C31	.0047	400	CO-H-4472	SI4700	D6-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C32A	1500		CC2D-152X	BPD-2X0015	DD2-152	DK071	812-0015	DCD-5215	5HK-2D15	
B	1500									
C33A	1500		CC2D-152X	BPD-2X0015	DD2-152	DK071	812-0015	DCD-5215	5HK-2D15	
B	1500									
C34A	1500		CC2D-152X	BPD-2X0015	DD2-152	DK071	812-0015	DCD-5215	5HK-2D15	
B	1500									
C35	5000		CCD502X	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C36	.047	400	CO-H-4473	BPD-05	DF-503	CUB4S47		PT4147	4TM-S47	
C37	470		CCD471X	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C38	470		CCD471X	BPD-00047	DD-471	K060	831-471	UC-5347	5GA-T47	
C39	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

Note 1. Not used in some versions.
♦ Items C29A, C29B, C29C, C29D, C29E, R17A, R17B and R17C are combined in one unit. When replacing items separately, C29C and C29D should total 250MMF.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	OLYMPIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	3Meg	½	PT-2160	AB-85	A47-3Meg-Z	Q13-140	U-57	Tone
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-3	SWE-21	76-1	US-28	Attach to R1A
R2A	2Meg	½	PT-567	ABT-80	A47F6-2Meg	Q13-139X	UT-449	Volume tap at 600KΩ
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R3	470KΩ	½	REB474M	BTS-470K	
R4	330Ω	½	REB331M	BTS-330	
R5	22KΩ	½	REB223M	BTS-22K	
R6	330Ω	½	REB331M	BTS-330	
R7	2.2Meg	½	REB225M	BTS-2.2Meg	
R8	1000Ω	½	REB102M	BTS-1000	
R9	470KΩ	½	REB474M	BTS-470K	Note 1
R10	470KΩ	½	REB474M	BTS-470K	
R11	10KΩ	½	REB103M	BTS-10K	
R12	470KΩ	½	REB474M	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	OLYMPIC PART No.	IRC PART No.	
R13	1Meg	½	REB105M	BTS-1Meg	
R14	33KΩ	½	REB333M	BTS-33K	
R15	22KΩ	½	REB223M	BTS-22K	
R16	470KΩ	½	REB474M	BTS-470K	
R17A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦	BTS-470K	
C	470KΩ			BTS-470K	
R18	150Ω	½	REB151K	BTS-150	
R19	470Ω	2	RED471M	BTB-470	
R20	180Ω	1	REC181K	BTA-180	

♦Items R17A, R17B, R17C, C29A, C29B, C29C, C29D, C29E are combined in one unit.

Note 1. Not used in some versions.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	OLYMPIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.4KΩ	3.3Ω	TR2690-1		A-3031 ①	A-3330 ①	24S51A ①		①Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	OLYMPIC PART No.	QUAM PART No.	RCA TYPE No.	
SP1	8"	PM	3.3Ω	SK3148-1	8A31	225S1	① Alternate
				SK1906 ①	8A31	225S1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	OLYMPIC PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	FM Ant. Coil	0Ω		CL4034				
L2	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries; IRC Part #CLA.
L3	RF Coil	2.8Ω		CK2446	19-1003		4608	4.7 Microhenries; IRC Part #CL-1.
L4	FM RF Coil	0Ω		CL4035				
L5	Parasitic Suppressor	0Ω		REB100M				2 Turns #22 Wire Wound On 10Ω Resistor.
L6	Fil. Choke	1.8Ω		CK2445	19-1002		4606	2.2 Microhenries; IRC Part #CLA.
L7	Cathode Choke	.22Ω		CK2447	19-1000		4602	.47 Microhenries; IRC Part #CLA.
L8	FM Osc. Coil	0Ω		CL4036				
L9	AM Loop Ant.	2.7Ω		LP4030				
L10	AM Osc. Coil	.4Ω	6.3Ω	CL1466	14-1074	BC-397*	5480-C*	
L11	1st FM IF	.7Ω	.7Ω	TR1643	16-3487	FM-254	1463	
L12	1st AM IF	15Ω	15Ω	TR1644	16-6758	BC-352	12-C1	
L13	2nd FM IF	.7Ω	.7Ω	TR1643	16-3487	FM-254	1463	
L14	2nd AM IF	9Ω	9Ω	TR1645	16-6758	BC-353	12-C2	
L15	Ratio Det.	1.7Ω	.9ΩCT	TR1646	17-3488■	FM-255	1465	Tertiary Winding - .4Ω

*Drill mtg. hole.
■Cut out chassis hole & drill mtg. holes.

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	OLYMPIC PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1		112-TS	A-1 and A-3	46-T	0-1 or S-1 and 0-3	

ASTATIC AND ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

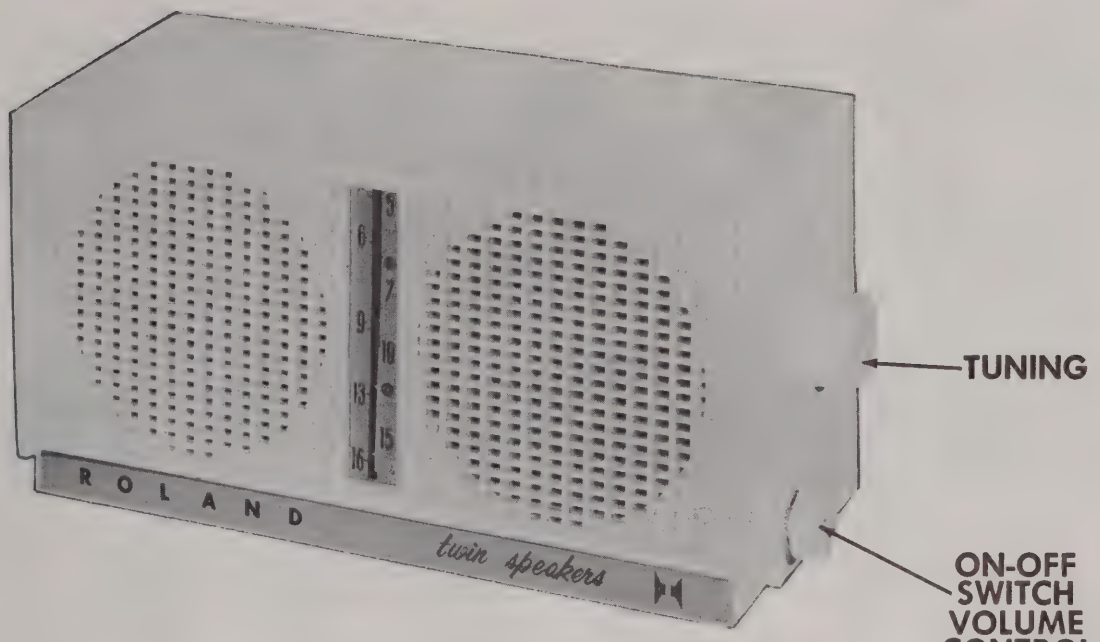
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	OLYMPIC PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2		† CR-55 or ♦CR-55D and † CR-55LP or ♦CR-55LPD	† C-449 or ♦C-449D and † A-448 or ♦A-448D	† W-64S or ♦W-64D and † W-64MGS or ♦W-64MGD	† Jewel ♦Diamond

MISCELLANEOUS

ITEM No.	PART NAME	OLYMPIC PART No.	NOTES
M3	Dial Light	BU2688	#1490
M4	Dial Light	BU2688	#1490
M5	Tuning Cap.	CV2165	4 Gang - (AM Sections: 29-525MMF, 22-195MMF).
M6	Switch	SW4017	AM - FM - Phono (Rotary - Wafer Type).
	Knob	KN3869	Volume - Mahogany
	Knob	KN3869-1	Volume - Tan
	Knob	KN3870	Tuning - Mahogany
	Knob	KN3870-1	Tuning - Tan
	Knob	KN3875	On-Off - Tone - Mahogany
	Knob	KN3875-1	On-Off - Tone - Tan
	Knob	KN3873	AM - FM - Phono - Mahogany
	Knob	KN3873-1	AM - FM - Phono - Tan
	Dial Pointer	PO1011	
	Dial Glass	DL3262-1	
	Dial Back Plate	MS965-2	

ROLAND
MODELS 5T7, 5T9



ROLAND
MODELS 5T7, 5T9

TRADE NAME	Roland Models 5T7, 5T9
MANUFACTURER	Roland Radio Corp., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	AC - DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110 - 120 Volts AC-DC RATING .22 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535KC - 1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to chassis.	455KC (Unmod.).	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal.	"	A6	"

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PARTS LIST AND DESCRIPTIONS

ROLAND MODEL 5T7

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA: ROLAND PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	Converter	12BE6	12BE6	
V2	IF Amplifier	12BA6	12BA6	
V3	Det. -AVC - AF Amplifier	12AT6	12AT6	
V4	Output	50C5	50C5	
V5	Rectifier	35W4	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	ROLAND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150		PRS150V80	BBRT84215	TCT3117	TDL-804020-150	FMT-339	TVA-3455
B	80	150		4020					
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	ROLAND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	200		BPD-05	DF-503	CUB2S5		PT415	2TM-S5	
C3	10									
C4A	100		†	† PA-97-1	† PC-50	† 111TM1	† 1403-01	UC-531	† D-1	
B	100							UC-531		
C5A	220									Note 1
B	2000									
C	5000		♦	♦PA-113-1	♦PC-150	♦116TM1	♦1408-01		♦DT-1	
D	250									
E										
C6	.01	400		BPD-01	D6-103	CUB4S1	GP3-333-103	PT411	4TM-S1	
C7	.01	600		BPD-01	D6-103	CUB6S1	GP3-333-103	PT611	6TM-S1	
C8	.1	400		P488N-1	DF-104	CUB4P1		PT401	4TM-P1	

Note 1. C5A is not used.
† Items C4A, C4B and R5 are combined in one unit.
♦ Items C5A, C5B, C5C, C5D, C5E, R7A, R7B and R7C are combined in one unit. When replacing items separately, C5D and C5E should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	ROLAND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½		AB-70	A47-1Meg-Z	Q13-137	U-53	Volume
B	Shaft			AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch			KB-1	SWE-12	76-1	US-26	Attach to R1A

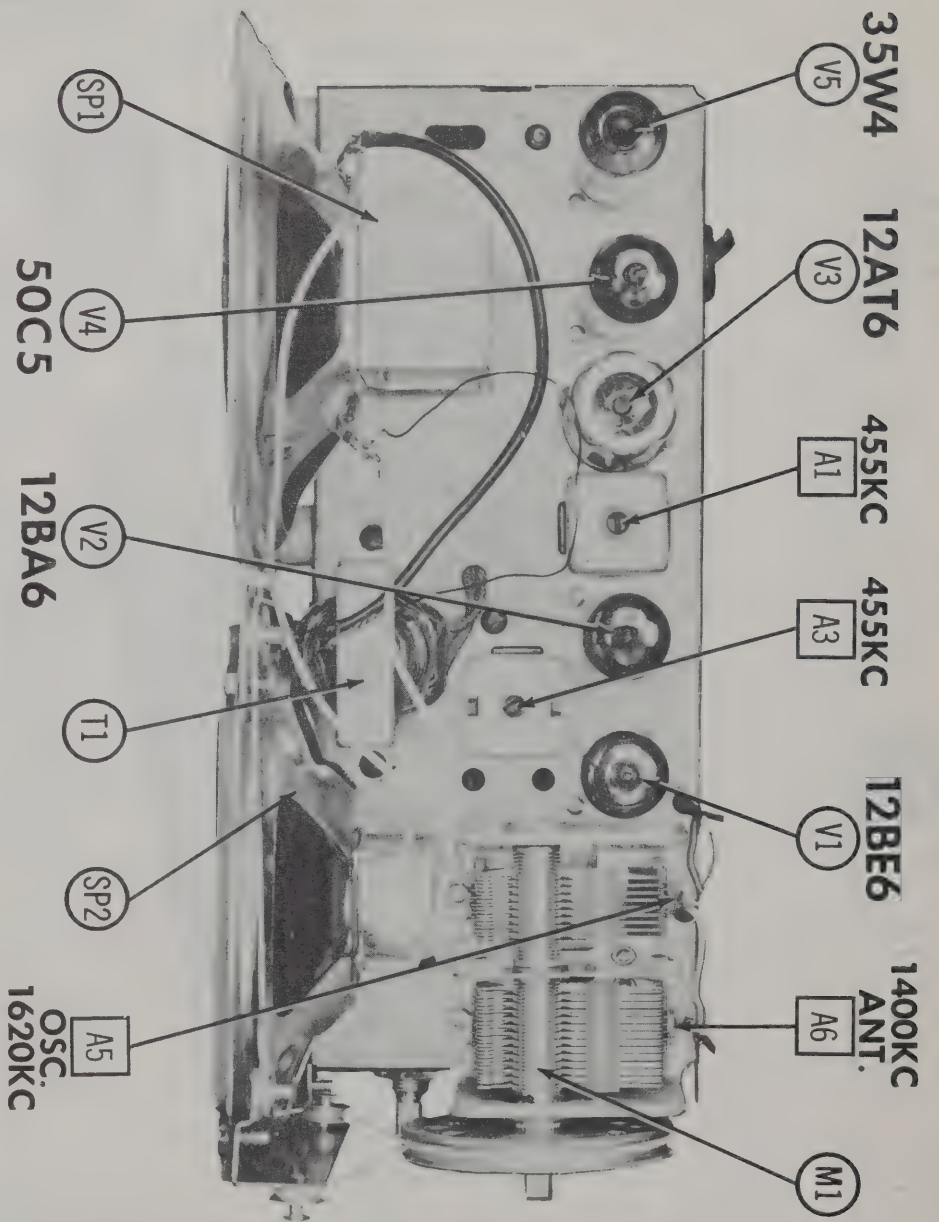
RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	ROLAND PART No.	IRC PART No.	NOTES
R2	22KΩ	½		BTS-22K	
R3	1Meg	1/3		BTS-1Meg	Note 1
R4	150Ω	½		BTS-150	
R5	47KΩ		†	BTS-47K	
R6	2.2Meg	½		BTS-2.2Meg	
R7A	6.8Meg			BTS-6.8Meg	
B	470KΩ		♦	BTS-470K	
C	470KΩ			BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	ROLAND PART No.	IRC PART No.	NOTES
R8	150Ω	½		BTS-150	
R9	150Ω	1		BTA-150	
R10	330Ω	1		BTA-330	
R11	2200Ω	1		BTA-2200	
R12	22Ω	1		BTA-22	Note 2

† Items R5, C4A, C4B are combined in one unit.
♦ Items R7A, R7B, R7C, C5A, C5B, C5C, C5D, C5E are combined in one unit.
Note 1. Model 5T7 uses a 250KΩ ½ W resistor in this application.
Note 2. Model 5T7 uses a 15Ω 1 W resistor in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ROLAND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.5KΩ	3-4Ω	TR-124	Z1101	A-3025	A-3332	26S58	S-12X	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	ROLAND PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	SP-102-1	4A07	223S1	
SP2	4"	PM	3-4Ω	SP-102-2	4A07	223S1	

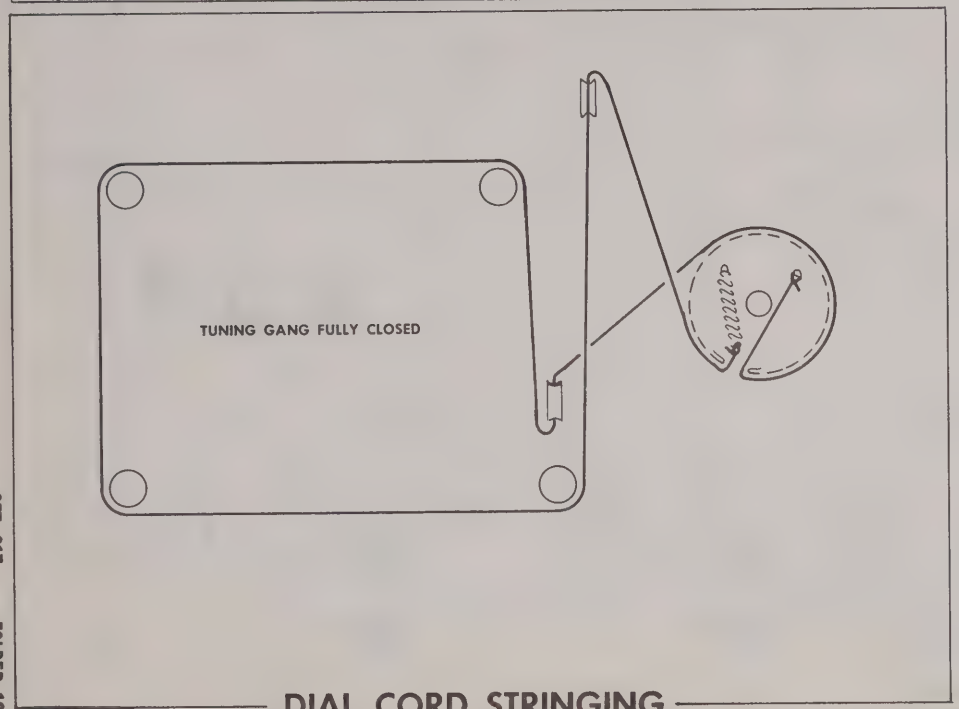
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	ROLAND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.9Ω						
L2	Osc. Coil	.5Ω	5.5Ω		14-1073*		69-Osc.■	
L3	Input IF	22Ω	22Ω	LF-50				
L4	Output IF	26Ω	26Ω	LF-50				

*Leads sufficient mtg. support.
■Drill mtg. hole.

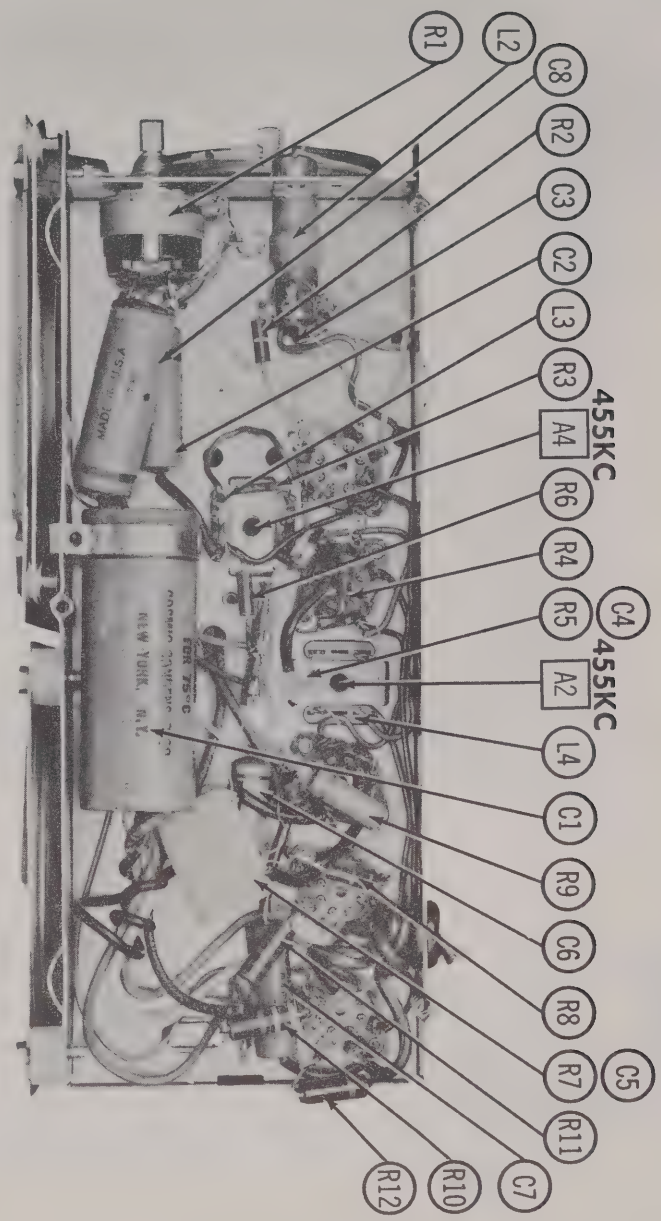
MISCELLANEOUS

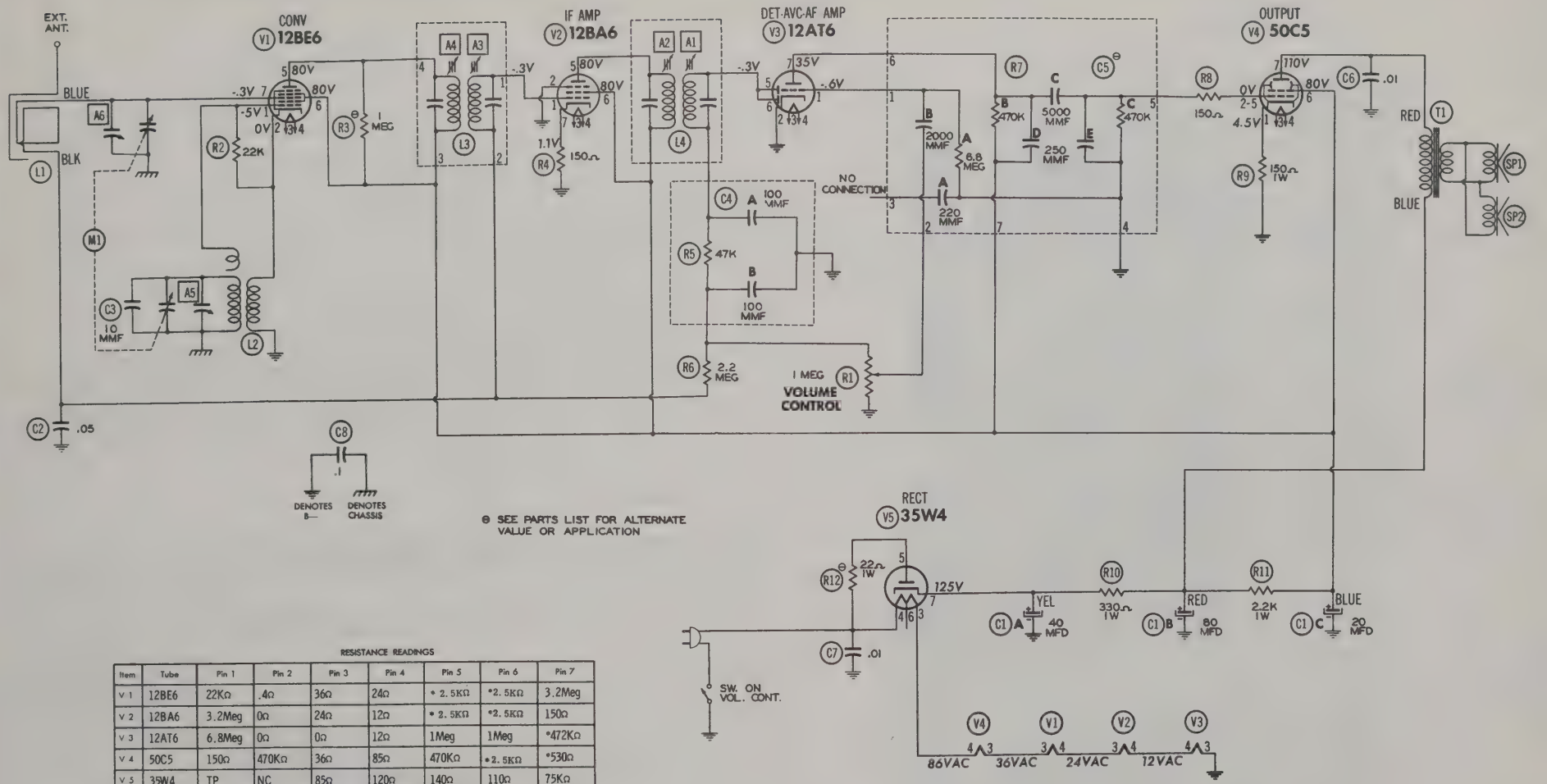
ITEM No.	PART NAME	ROLAND PART No.	NOTES
M1	Tuning Cap.	CV-72	2 gang (26 - 475MMF, 16 - 180MMF).



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW





⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.4Ω	36Ω	24Ω	* 2.5KΩ	*2.5KΩ	3.2Meg
V 2	12BA6	3.2Meg	0Ω	24Ω	12Ω	* 2.5KΩ	*2.5KΩ	150Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	12Ω	1Meg	1Meg	*472KΩ
V 4	50C5	150Ω	470KΩ	36Ω	85Ω	470KΩ	*2.5KΩ	*530Ω
V 5	35W4	TP	NC	85Ω	120Ω	140Ω	110Ω	75KΩ

* - MEASURED FROM PIN 7 OF V5.
TP - TIE POINT
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

IF=455KC

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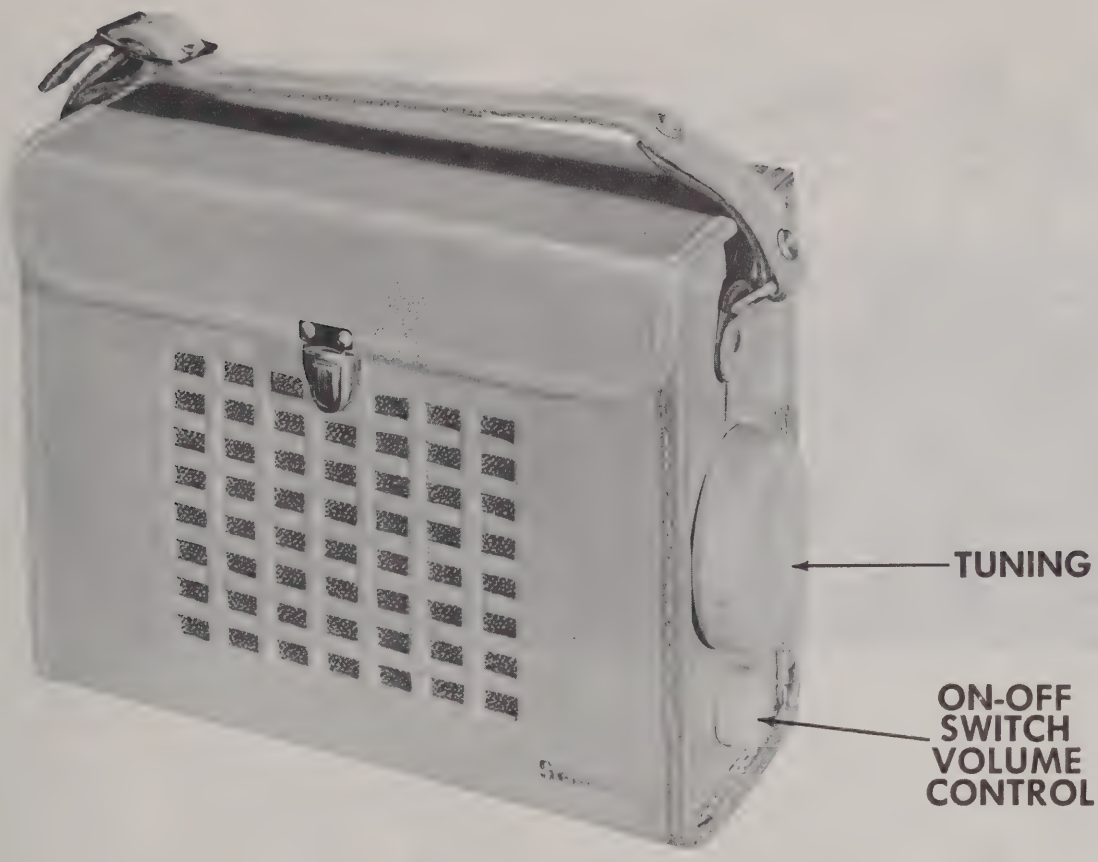
SENTINEL
MODEL 359P



SENTINEL
MODEL 359P

TRADE NAME	Sentinel Model 359P
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster, Evanston, Ill.
TYPE SET	Battery Operated Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	1.5 Volts "A" Supply & 67.5 Volts "B" Supply
RATING	245MA @ 1.5 Volts DC & 10.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535KC -1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to chassis.	455KC (400Ω mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		SENTINEL PART No.	STANDARD REPLACEMENT	
V1	Converter	1R5	1R5	
V2	IF Amplifier	1U4	1U4	
V3	Det. -AVC-AF Amplifier	1U5	1U5	
V4	Output	3V4	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SENTINEL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	10	70	25E82	SRE70V10		TC42	TD-10-70		

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SENTINEL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.047	200	23E3214	BPD-05	DF-503	CUB2S47		PT4147	2TM-S47	
C3	100		23E4000-17	SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C4	5000		23E4004-15	BPD-005	DD-502	K080	811-005	DC-525	5HK-D5	
C5A	150									
B	2000									
C	150		♦23E2041-8							
D	10000									
E	5000									
C6	1000		23E4004-5	BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	

♦ Items C5A, C5B, C5C, C5D, C5E, R9A, R9B, R9C, and R9D are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SENTINEL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	2Meg	½	28E119	AB-76	A47-2Meg-Z	Q13-139	U-55	Volume
B	Shaft		Not Req.	AK-4	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	KB-2	SWE-20	76-2	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SENTINEL PART No.	IRC PART No.	
R2	4.7Meg	½	27E475M-½	BTS-4.7Meg	
R3	68KΩ	½	27E683K-½	BTS-68K	
R4	470KΩ	½	27E474M-½	BTS-470K	
R5	270KΩ	½	27E274M-½	BTS-270K	
R6	6800Ω	½	27E682K-½	BTS-6800	

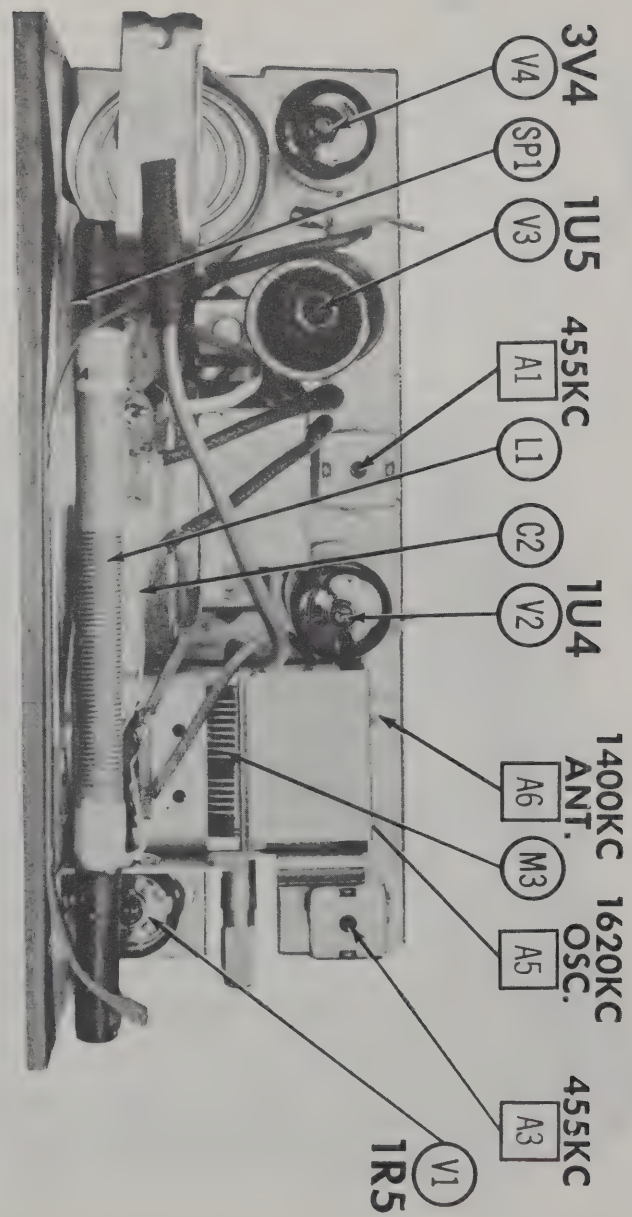
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SENTINEL PART No.	IRC PART No.	
R7	4.7Meg	½	27E475M-½	BTS-4.7Meg	
R8	1Meg	½	27E105M-½	BTS-1Meg	
R9A	4.7Meg			BTS-4.7Meg	
B	4.7Meg			BTS-4.7Meg	
C	1Meg		♦23E2041-8	BTS-1Meg	
D	2.2Meg			BTS-2.2Meg	

♦ Items R9A, R9B, R9C, R9D, C5A, C5B, C5C, C5D, C5E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SENTINEL PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	12KΩ	3-4Ω	22E87-3		A-2999				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SENTINEL PART No.	QUAM PART No.	RCA TYPE No.	
SP1	4"	PM	3-4Ω	1E62			

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SENTINEL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.9Ω		64E37				
L2	Osc. Coil	2.3Ω	10Ω	20E837	14-1074	BC-394	70-Osc. *	
L3	Input IF	15Ω	15Ω	20E1003	16-6800		10-C1	
L4	Output IF	15Ω	15Ω	20E1003	16-6801		10-C2	

* Use leads for mtg. support.

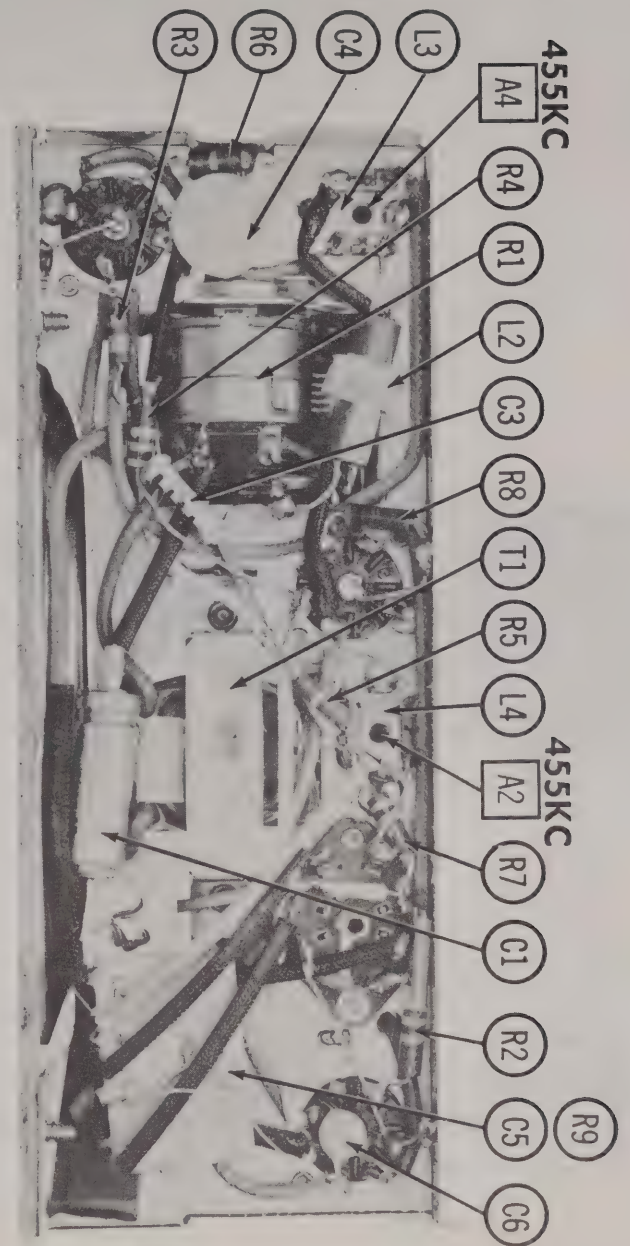
BATTERIES

ITEM No.	VOLTAGE	SENTINEL PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M1	1.5V "A"		964			21R			
M2	67.5V "B"			477			P45		

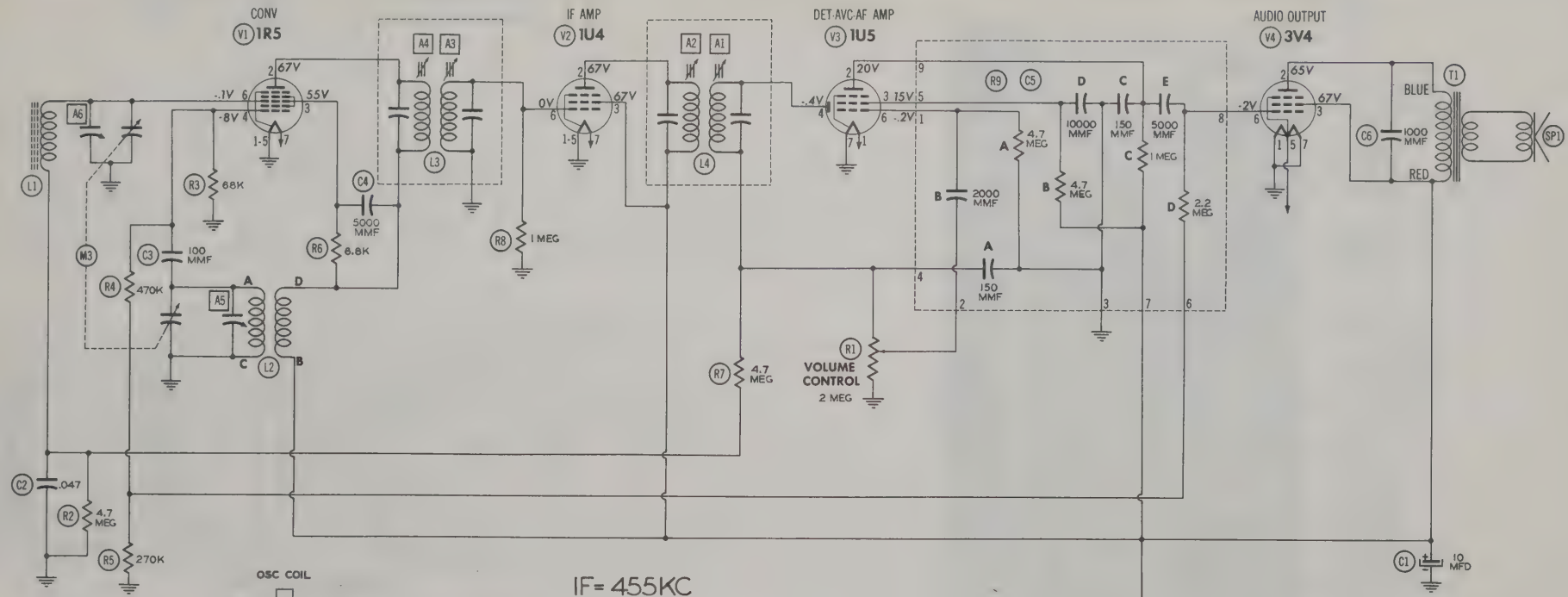
MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
M3	Tuning Cap.	24E67	2 gang (13 - 210MMF, 11 - 110MMF).
	Case	7E462	Black, less extension strap.
	Case	7E462-2	Brown, less extension strap.
	Case	7E462-3	Tan, less extension strap.
	Strap	46E32	Extension, black
	Strap	46E32-2	Extension, brown
	Strap	46E32-3	Extension, tan
	Knob	37E101	Station selector - black
	Knob	37E101-2	Station selector - brown
	Knob	37E101-3	Station selector - tan
	Knob	37E51-3	On-Off - Volume - black
	Knob	37E51-4	On-Off - Volume - brown
	Knob	37E51-5	On-Off - Volume - tan

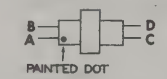
CHASSIS—BOTTOM VIEW



SENTINEL MODEL 359P



OSC COIL



IF= 455KC

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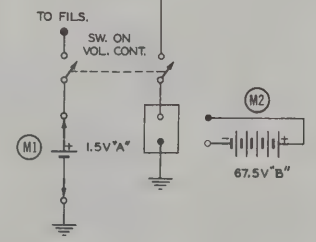

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	**17Ω	**6.8KΩ	6EKΩ	*	2.5Meg	*
V 2	1U4	*	**15Ω	** 0Ω	TP	*	15Ω	*
V 3	1U5	*	**1Meg	**4.7Meg	2Meg	TP	4.7Meg	*
V 4	3V4	*	** 650Ω	80KΩ	TP	*	2.5Meg	*

* - DO NOT USE OHMETER TO MEASURE FILAMENT RESISTANCE.
** - MEASURED FROM POSITIVE SIDE OF C1.
TP - TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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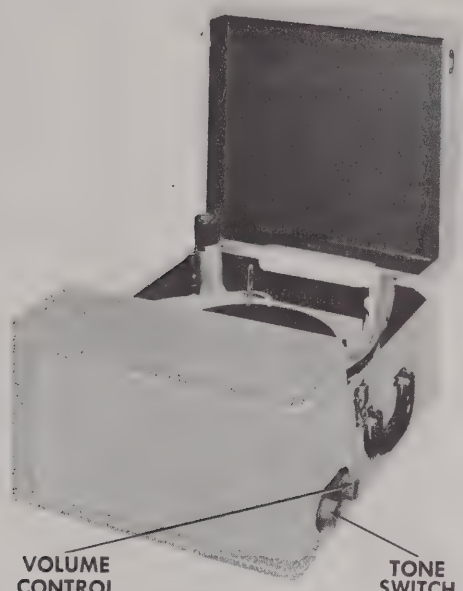
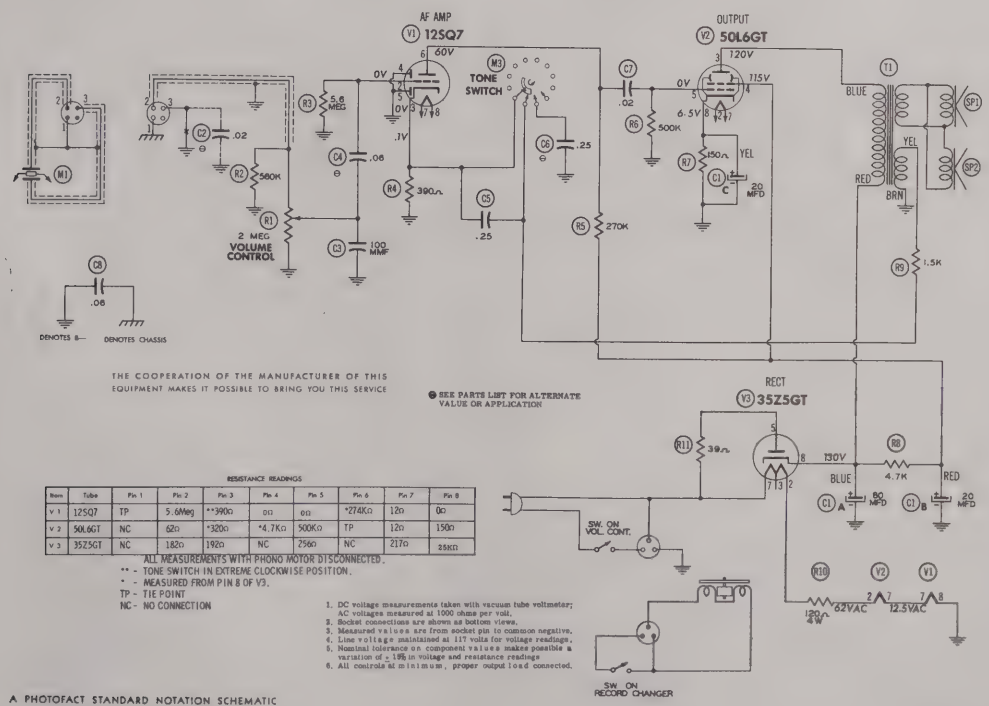
SILVERTONE
MODELS 4249, 42491 (Ch. 137.91800)



TRADE NAME	Silvertone Models 4249, 42491 (Ch. 137.91800)
SUPPLIER	Sears Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Automatic Record Changer
TUBES (Three)	Types 12SQ7 AF Amp., 50L6GT Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC - 60 Cycles RATING .22 Amp. @ 117 Volts AC

RECORD CHANGER UNIT - SILVERTONE MODEL 488.216-9



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● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SQ7	TP	5.6Meg	**390Ω	0Ω	0Ω	*274KΩ	12Ω	0Ω
V 2	50L6GT	NC	62Ω	*320Ω	*4.7KΩ	500KΩ	TP	12Ω	150Ω
V 3	35Z5GT	NC	182Ω	192Ω	NC	256Ω	NC	217Ω	25KΩ

ALL MEASUREMENTS WITH PHONO MOTOR DISCONNECTED.
** - TONE SWITCH IN EXTREME CLOCKWISE POSITION.
* - MEASURED FROM PIN 8 OF V3.
TP - TIE POINT
NC - NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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317-14

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	REPLACEMENT DATA		NOTES
		SILVERTONE PART No.	STANDARD REPLACEMENT	
V1	A F Amplifier	12SQ7	12SQ7	
V2	Output	50L6GT	50L6GT	
V3	Rectifier	35Z5GT	35Z5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	150	C11504	AFH-3-82	C016	FP311.1	TM-3016	T-295	TVL-3430
B	20	150							
C	20	25							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.02	200	C11508	BPD-02	DD-203	CUB2S2	817-02	PT412	2TM-S2	Note 1
C3	100		C11534	S1100	DD-101	TP34	801-101	UC-531	5GA-T1	
C4	.06	200	C11509	P288N-06		CUB6S6		PT616	6TM-S6	Note 2
C5	.25	200	C11511	P288N-25		CUB2P25		PT4025	2TM-P25	
C6	.25	200	C11511	P288N-25		CUB2P25		PT4025	2TM-P25	Note 3
C7	.02	200	C11508	BPD-02	DD-203	CUB2S2	817-02	PT412	2TM-S2	
C8	.06	400	C11509	P488N-06		CUB6S6		PT616	6TM-S6	

Note 1. Not used in some versions.
Note 2. Some versions may use .02MFD in this application. (Part No. C11508).
Note 3. Some versions may use .15 MFD in this application. (Part No. C11510).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Silvertone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	2Meg	½	11512					Volume & Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R2	560KΩ	½	C8842	BTS-560K	
R3	5.6Meg	½	C10301	BTS-5.6Meg	
R4	390Ω	½	C9894	BTS-390	
R5	270KΩ	½	C10904	BTS-270K	
R6	500KΩ	½	C10305	BTS-470K	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SILVERTONE PART No.	IRC PART No.	
R7	150Ω	½	C9897	BTS-150	
R8	4700Ω	½	C10429	BTS-4700	
R9	1500Ω	½	C11143	BTS-1500	
R10	120Ω	4	C10306		
R11	39Ω	½	C10428	BTS-39	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2.2KΩ	1.5Ω	C-11503						
		SEC. 2 1.08Ω RES.							

SPEAKER

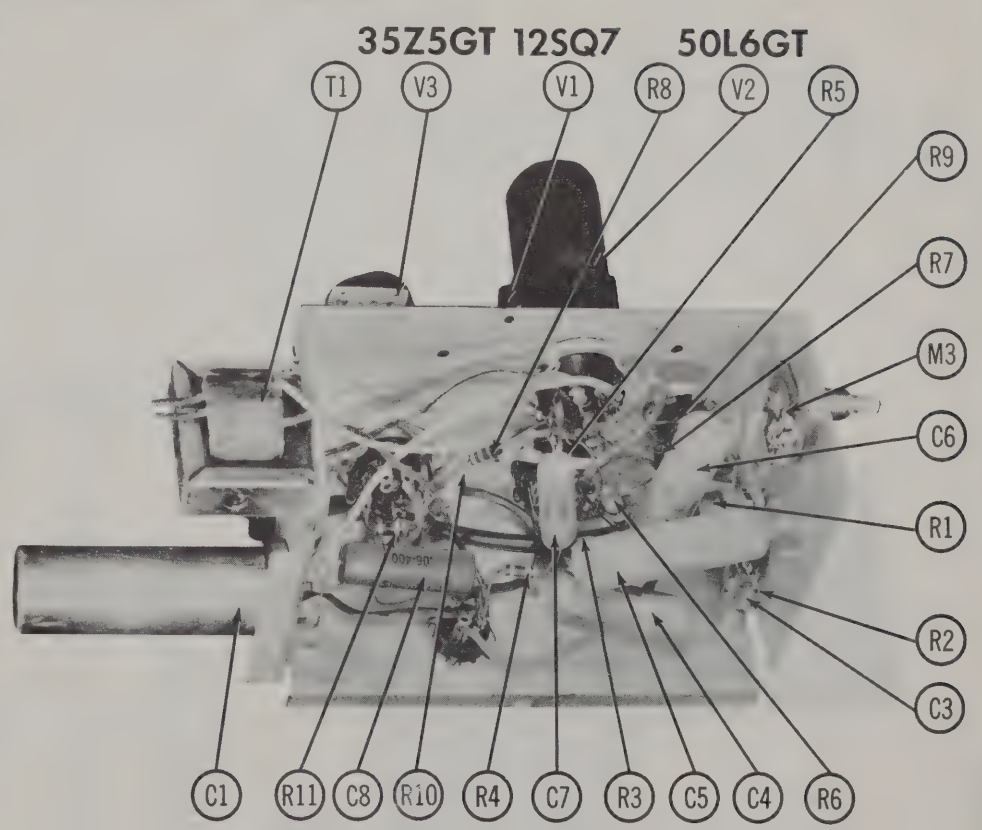
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	RCA TYPE No.	
SP1	6"	PM	3.2Ω	C-11505	6A1	229S1	
SP2	5 1/4"	PM	3Ω	C-10901	52A1	217S1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	SILVERTONE PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	C11501	55-T	GD-J	47	0-1 or S-1 and 0-3	

ASTATIC AND ELECTRO VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	SILVERTONE PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	5742	*S-67 or † S-66 or ♦† S-66SD or ♦S-66D	† AC-434 or ♦† AC-434D1 or †♦AC-434D2 or ♦AC-434D or † AA-434 or ♦AA-434D	† W-75TPS or ♦† W-75DS or ♦W-75TPD	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M3	Switch	C11513	Tone
	Case	C4249	Model 4249
	Case	C42491	Model 42491
	Handle	C9863	
	Knob	C11506	Control (2 used)

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ZENITH MODEL X2229R (Ch. 19X21)

TRADE NAME	Zenith	MODELS	CHASSIS
		X2229R, RU, X2230E, EU, R, RU, X2256E, EU, R, RU	19X21, U
		X2254M, MU, X2257, E, EU, R, RU, U, X2258, E, EU, R, RU, U	19X22, U
		X2264EQ, EQU, RQ, RQU	19X22Q, U
		X2640E, EU, R, RU	19X24, U
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois		
TYPE SET	Television Receiver		
TUBES	Nineteen		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.6 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 7 push-on type control knobs from front panel of cabinet.
2. Remove 5 metal screws. Remove rear cover.
3. Disconnect speaker leads.
4. Remove 4 chassis bolts. Remove chassis.
5. Remove 4 speaker nuts. Remove speaker.

MODELS	CHASSIS
X2229R, RU, X2230E, EU, R, RU, X2256E, EU, R, RU	19X21, U
X2254M, MU, X2257, E, EU, R, RU, U, X2258, E, EU, R, RU, U	19X22, U
X2264EQ, EQU, RQ, RQU	19X22Q, U
X2640E, EU, R, RU	19X24, U

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

For touch-up adjustment of the VHF tuner oscillator circuit, it is necessary to remove rear cover and supply power to set. Adjustments are made thru the hole marked "Bull's Eye Adjustment" and are accessible one at a time as the selector switch is turned to each channel. (Fine tuning control must be set to the center of its range before making adjustments). Use Zenith alignment wrench part #68-21 for adjustment.

PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass remove 2 metal screws from name plate. Remove name plate and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION

See tube placement chart on page 5.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator may be made from the front of the receiver. Adjust the horizontal hold control (L30) until picture synchronizes horizontally. If satisfactory results cannot be obtained see horizontal sweep circuit adjustments.

SOUND IF DETECTOR BUZZ ADJUSTMENT

Adjust the buzz control located on the rear apron of the chassis for maximum volume and minimum buzz. If results are unsatisfactory, see alignment instructions.

FUSES

One fuse is used for horizontal sweep circuit protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

ANTI-PIN CUSHION ADJUSTMENT

Reduce the picture size so that the sides of the raster are visible, and position the magnets so that all sides are straight lines and the corners are at right angles.

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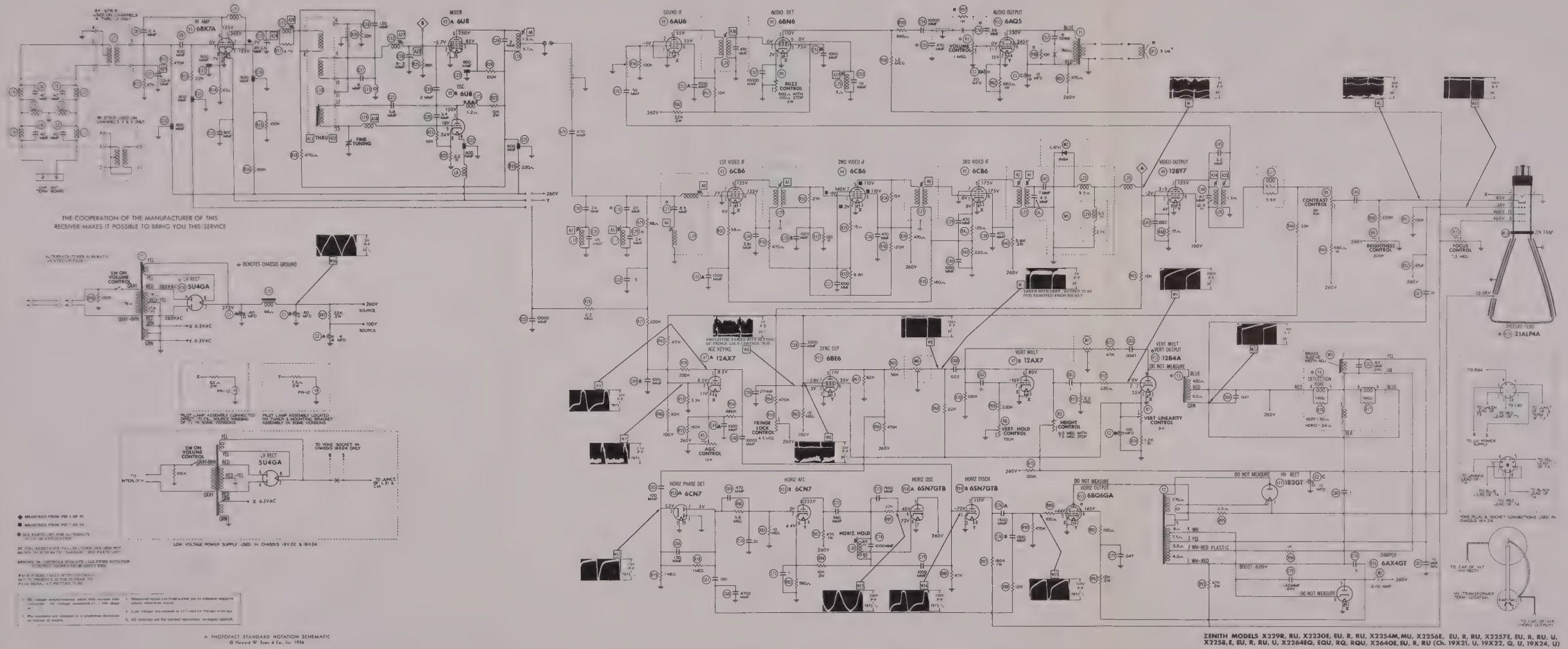
THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
RF AMP 6BK7A
MIXER V7A 6U8
OSC V7B 6U8
FINE TUNING
SOUND IF V1 6AU6
AUDIO DET V9 6BN6
AUDIO OUTPUT V10 6AQ5
VOLUME CONTROL
BUZZ CONTROL
1ST VIDEO IF V2 6CB6
2ND VIDEO IF V4 6CB6
3RD VIDEO IF V5 6CB6
VIDEO OUTPUT V6 12BY7
CONTRAST CONTROL
BRIGHTNESS CONTROL
FOCUS CONTROL
PICTURE TUBE V21 21ALP4A
ION TRAP
AMPLITUDE VARIES WITH SETTING OF PICTURE CONTRAST CONTROL
AGC KEYING
SYNC SEP 6BE6
FRINGE LOCK CONTROL
AGC CONTROL
VERT MULT V7B 12AX7
VERT MULT V8 12AX7
VERT OUTPUT V12 12B4A
VERT HOLD CONTROL
HEIGHT CONTROL
VERT LINEARITY CONTROL
DEFLECTION YOKE
HORIZ PHASE DET V13B 6CN7
HORIZ AFC V13A 6CN7
HORIZ OSC V14A 6SN7GTB
HORIZ DISCH V14B 6SN7GTB
HORIZ OUTPUT V15 6BQ6GA
HV RECT V17 1B3GT
DAMPER V16 6AX4GT
HV TRANSFORMER TERM LOCATION
YOKE PLUG & SOCKET CONNECTIONS USED IN CHASSIS 19X24
ALTERNATE TUNER & REMATIC MOUNTED ON PANEL
SW ON VOLUME CONTROL
9 LV RECT 5U4GA
285VAC
275V
40 MFD
80 MFD
82K 5W
260V SOURCE
100V SOURCE
X 6.3VAC
+V 6.3VAC
DENOTES CHASSIS GROUND
PILOT LAMP ASSEMBLY CONNECTED DIRECTLY TO FIL. SOURCE WINDING OF TV IN SOME VERSIONS
PILOT LAMP ASSEMBLY LOCATED ON TUNER & MOUNTING BRACKET ASSEMBLY IN SOME VERSIONS
TO HOME SOCKET IN CHASSIS #22M ONLY
TO JUNCT OF L31 & L1A
LOW VOLTAGE POWER SUPPLY USED IN CHASSIS 19X22 & 19X24
MEASURED FROM PIN 1 OF V1
MEASURED FROM PIN 7 OF V6
SEE PARTS LIST FOR ALTERNATE TUNER APPLICATION
DC COIL RESISTANCE FALLS OFF WHEN HOT
SHOWN IN BYPASS MATRIX DIAGRAM - SEE PARTS LIST
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION
SHOWN IN COUNTERCLOCKWISE LIMIT END
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE ACTUAL PEAK TO PEAK SIGNAL AT PICTURE TUBE
1. DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured as rms value unless otherwise noted.
2. Pin numbers are counted in a clockwise direction as indicated.
3. Measured values are from socket pin to common negative unless otherwise noted.
4. Line voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

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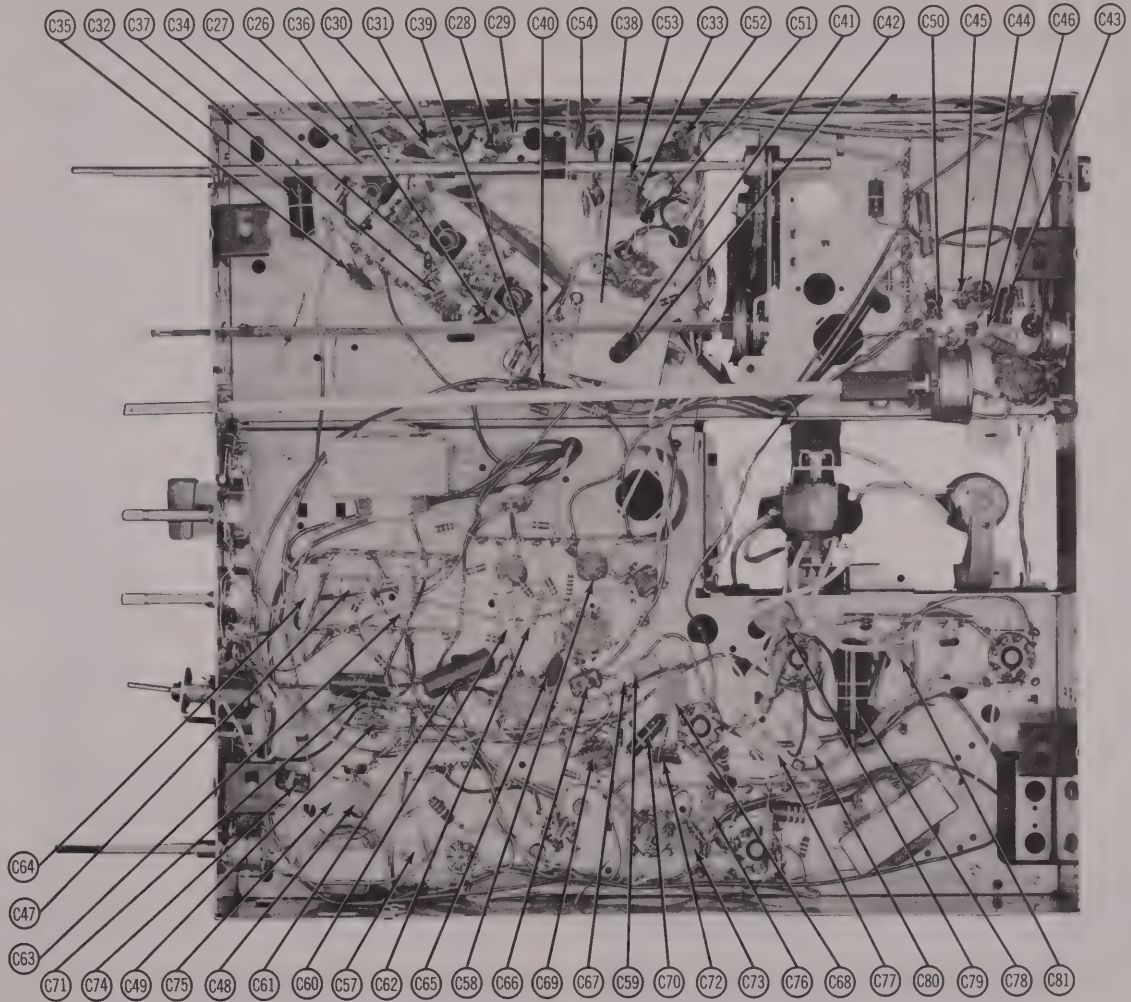
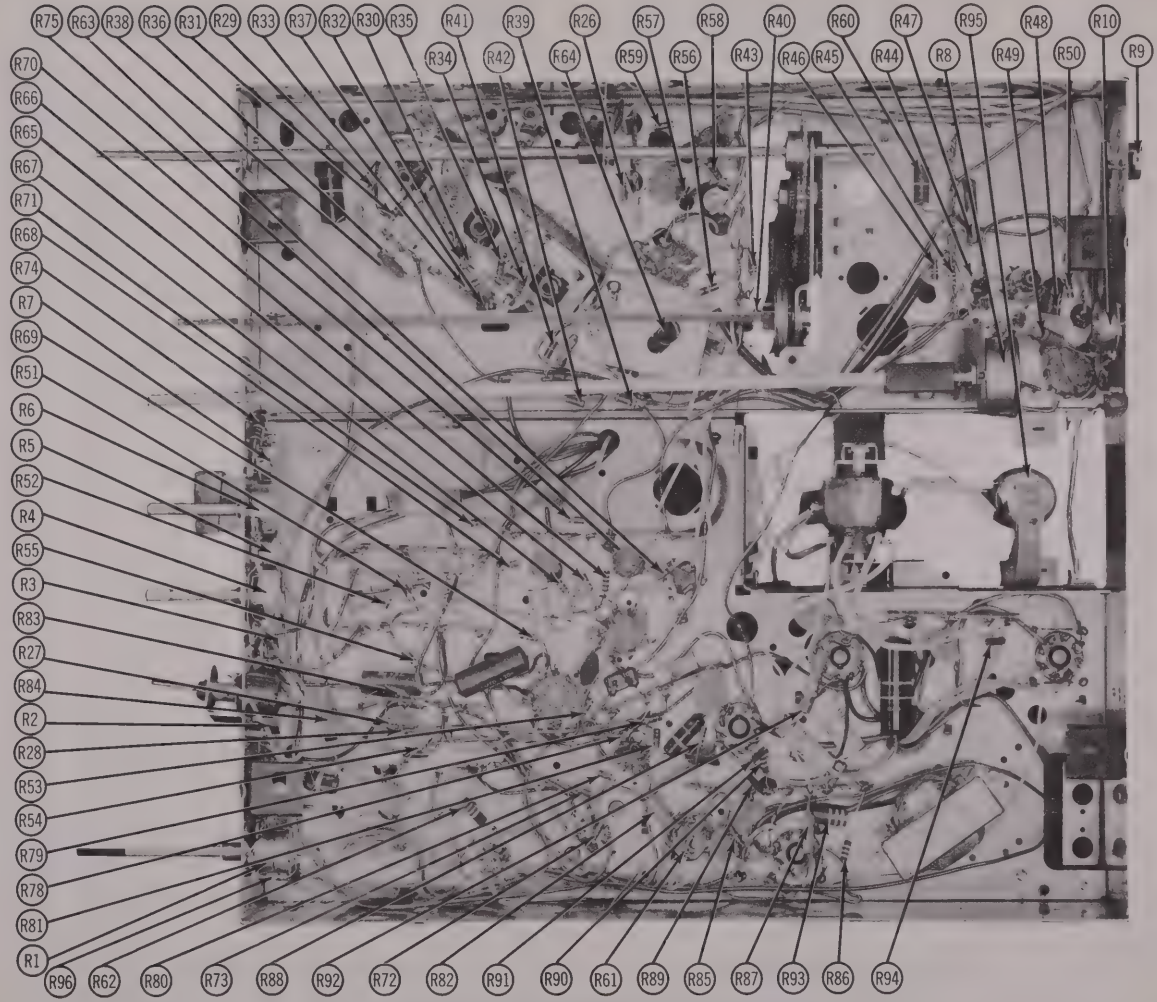
ZENITH MODELS X229R, RU, X2230E, EU, R, RU, X2254M, MU, X2256E, EU, R, RU, X2257E, EU, R, RU, U, X2258, E, EU, R, RU, U, X2264EQ, EQU, RQ, RQU, X2640E, EU, R, RU (Ch. 19X21, U, 19X22, Q, U, 19X24, U)



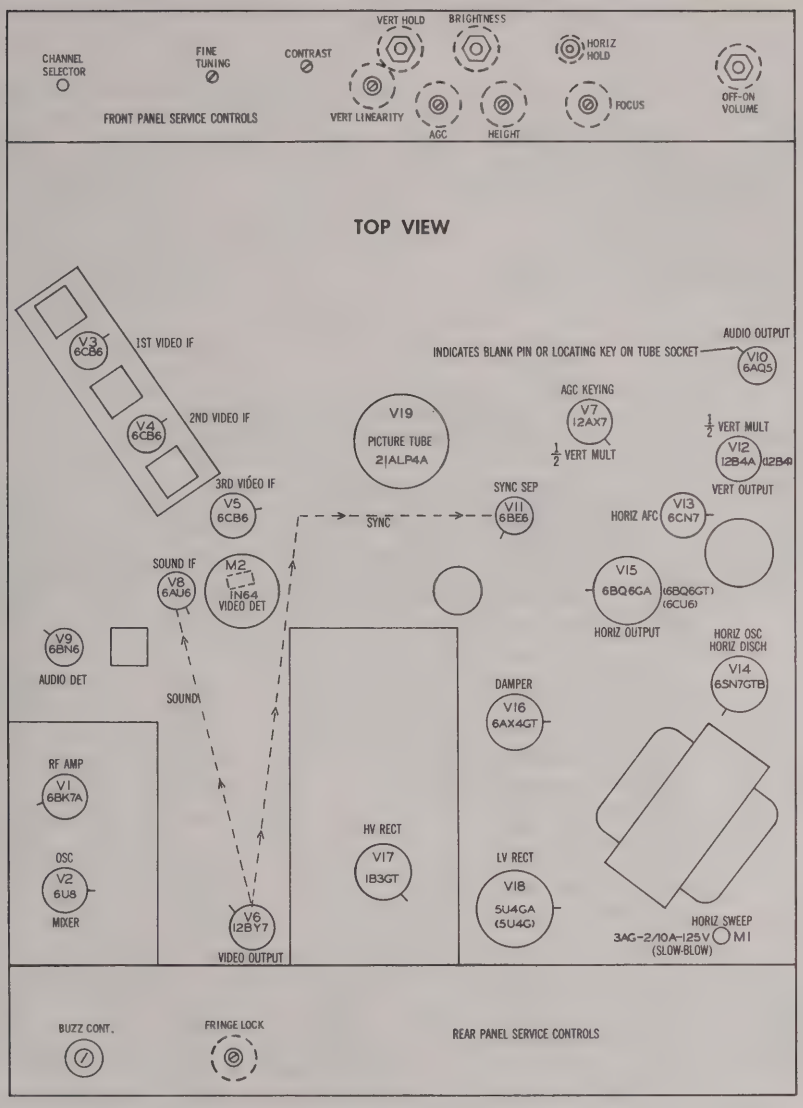
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

ZENITH MODELS: X22229R, RU, X2230E, EU, R, RU, X2254M, MU, X2256E, EU, R, RU, X2257, E, EU, R, RU, U, X2258, E, EU, R, RU, U, X2264EQ, EQU, RQ, RQU, X2640E, EU, R, RU (Ch. 19X21, U, 19X22, Q, U, 19X24, U)

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V18

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V7, V19
Has pic, no sound - V8, V9, V10
Overloaded picture - V7

SYNC FAILURE
No vert. sync - V7, V11, V12
No horiz. sync - V11, V13, V14
No vert. or horiz. sync - V11

SWEEP FAILURE
No raster, has sound - V14, V15, V16, V17, V19 Fuse (M1)
No vertical deflection - V7, V12
Poor vert. linearity or foldover - V7, V12
Poor horiz. linearity or foldover - V14, V15, V16
Narrow picture - V14, V15, V16, V17, V18
Vert. off freq. - V7, V11, V12
Horiz. off freq. - V11, V13, V14

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

If the set is to be aligned with the picture tube removed, the high voltage lead should be securely taped away from the chassis.

VIDEO IF ALIGNMENT

Place the tuner turret mid-way between two channels.
Connect the negative lead of a 2 volt bias supply to the ungrounded side of C33. Connect the positive lead to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to pin 1 (grid) of 6CB6 (V5). Low side to chassis.	44MC (10MC Swp.)	39.75MC 45.75MC	See note above	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A1, A2	Adjust for response curve similar to Fig. 1. If correct response cannot be obtained check to see if slugs are entering the coils from the outside ends of the coils.
2.	"	High side to point (B). Low side to chassis.	"	39.75MC 41.25MC 47.25MC	"	"	A3, A4, A5	Reduce bias to zero. Turn sweep generator output to maximum. Increase scope gain to magnify trap portions of response curve. Adjust traps for response similar to Fig. 2.
3.	"	"	"	42.75MC 45.0MC 45.75MC	"	"	A6, A7, A8, A9	Replace 2 volt bias. Adjust for response curve similar to Fig. 3. Readjustment of A1 and A2 should not be required to obtain proper response.

OSCILLATOR ALIGNMENT

The master oscillator adjustment A10 is made only if the individual oscillator adjustments fail to bring all channels within the range of the fine tuning control. If channels 2 through 6 fall within the fine tuning range, but the high channels do not, slight adjustment of A10 may bring the high channels in.
Ground the AGC lead from the tuner (yellow lead) to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	57MC (10MC Swp.)	59.75MC	2	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A11	Adjust to place sound marker in trap notch as shown in Fig. 4.
			63MC (10MC Swp.)	65.75MC	3		A12	
			69MC (10MC Swp.)	71.75MC	4		A13	
			79MC (10MC Swp.)	81.75MC	5		A14	
			85MC (10MC Swp.)	87.75MC	6		A15	
			177MC (10MC Swp.)	179.75MC	7		A16	
			183MC (10MC Swp.)	185.75MC	8		A17	
			189MC (10MC Swp.)	191.75MC	9		A18	
			195MC (10MC Swp.)	197.75MC	10		A19	
			201MC (10MC Swp.)	203.75MC	11		A20	
			207MC (10MC Swp.)	209.75MC	12		A21	
			213MC (10MC Swp.)	215.75MC	13		A22	

VHF RF AND MIXER ALIGNMENT

Ground the AGC lead (yellow wire) from the tuner to chassis.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	69MC (10MC Swp.)	67.25MC 71.75MC	4	Vert. Amp. to point (B). Low side to chassis.	A23, A24, A25	Adjust for response curve similar to Fig. 5.
6.	"	"	201MC (10MC Swp.)	199.25MC 203.75MC	"	"	A26, A27	Adjust for response curve similar to Fig. 5. If passband is not correct, SLIGHTLY bend L13 (slotted tab in shield plate). Repeat steps 5 and 6 for optimum results on all channels.

FIG. 1

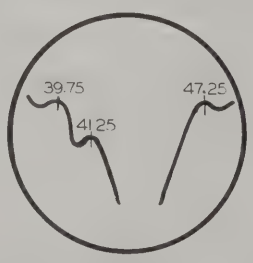


FIG. 2

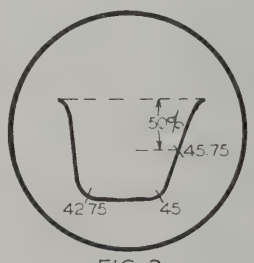


FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

UHF TUNER ALIGNMENT

Any attempt to peak any one particular channel will usually cause serious degradation of the other channels.
No attempt should be made to adjust the oscillator unless the calibration is off more than three channels. Turn the UHF tuning dial to channel 54. The rocker arm of the tuner should be horizontal. If it is not, loosen the set screw on the drive pulley and turn the tuner shaft independently of the pulley until the rocker arm is horizontal with the channel indicator at channel 54. Tighten the set screw.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	Two 120Ω Carbon Resistors	Across UHF antenna terminals with 120Ω in each lead.	713MC (10MC Swp.)	711.25MC	54	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A28, A29, A30	Adjust for response similar to Fig. 6. When adjusting the oscillator adjustment (A28) two responses may be found, the correct setting is with the adjustment in the most counter clockwise position.
8.	"	"	473MC (10MC Swp.)	471.25MC	14	"		Check for response similar to Fig. 6. If the oscillator is off calibration more than 3 channels, adjust the oscillator travel (oscillator, mixer and antenna travel adjustments are the round thumb screws on top of the tuner) adjustment to scale. Care must be exercised when making this adjustment not to move the rocker arm out of its bearing. Adjust the mixer and antenna travel adjustments for maximum amplitude response.
9.	"	"	887MC (10MC Swp.)	885.25MC	83	"	A31, A32, A33	Adjust A31 to place marker at 50% as in Fig. 6. Adjust A32 and A33 for maximum amplitude of response.

SOUND ALIGNMENT

Connect an attenuator (Zenith Part No. S-17203 or equivalent) in series with the receiver antenna. Tune in a TV station and adjust the attenuator until the signal falls below the limiting level of the 6BN6 audio detector, as evidenced by hiss similar to super-regeneration.
Adjust the sound take-off transformer (A34 and A35), the sound IF coil (A36) and the quadrature coil (A37) for maximum sound and best quality. Adjust the buzz control (R9) for minimum buzz. If the buzz cannot be eliminated with the buzz control, check the setting of the AGC control. If during any of the sound IF adjustments the signal rises above the limiting level (hiss disappears), increase the attenuation until the hiss returns.

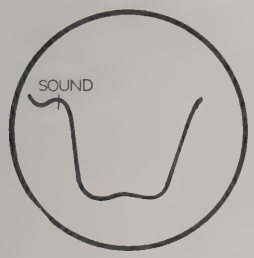


FIG.4

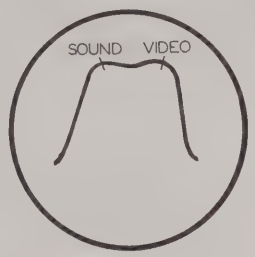


FIG.5

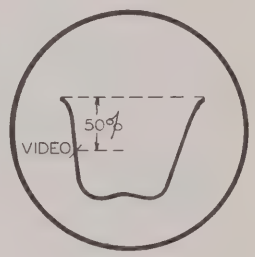
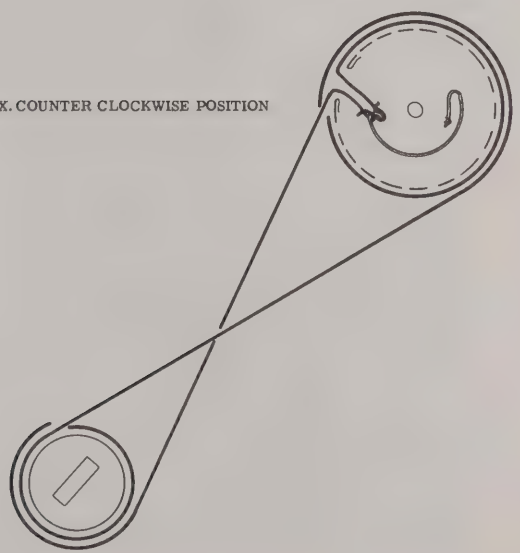


FIG.6

FINE TUNING PULLEY MAX. COUNTER CLOCKWISE POSITION

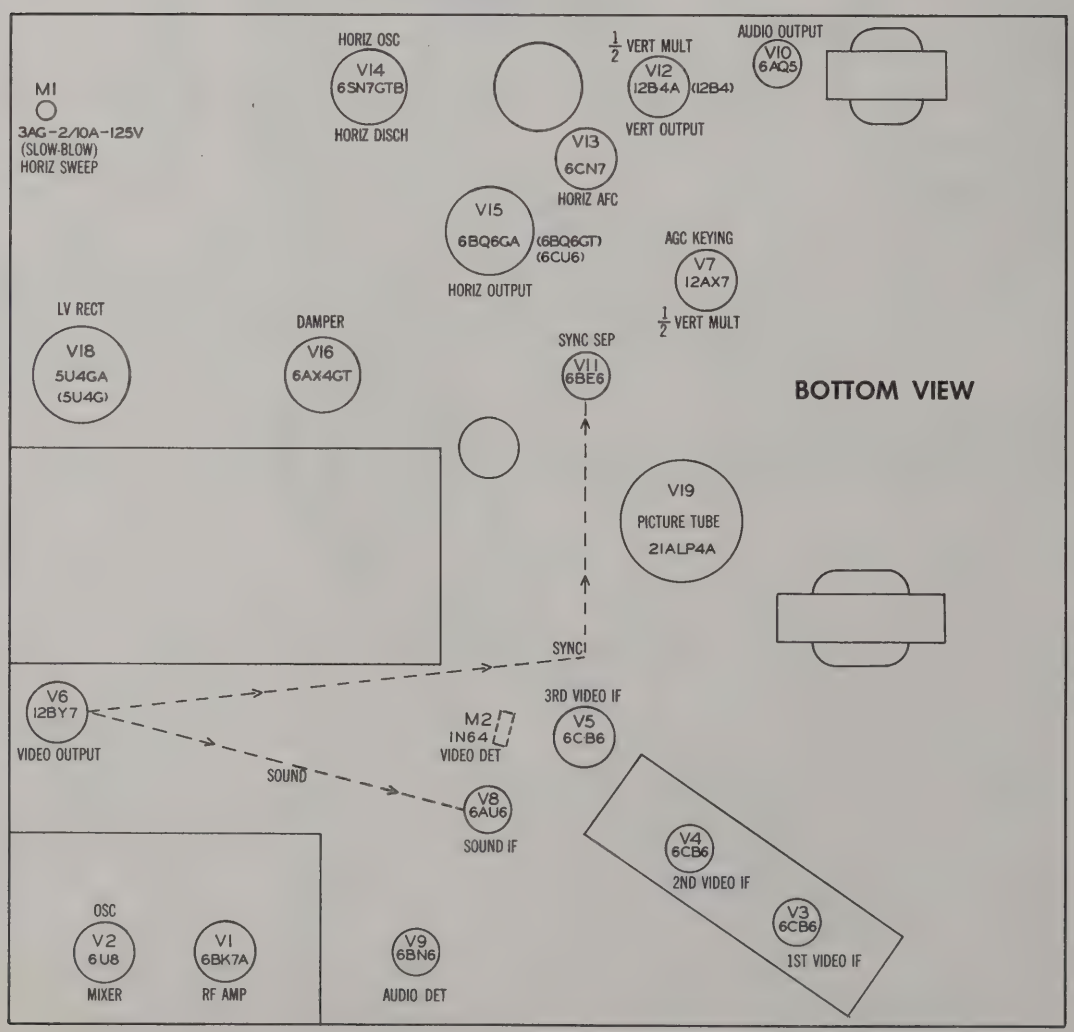


FINE TUNING DRIVE CORD STRINGING

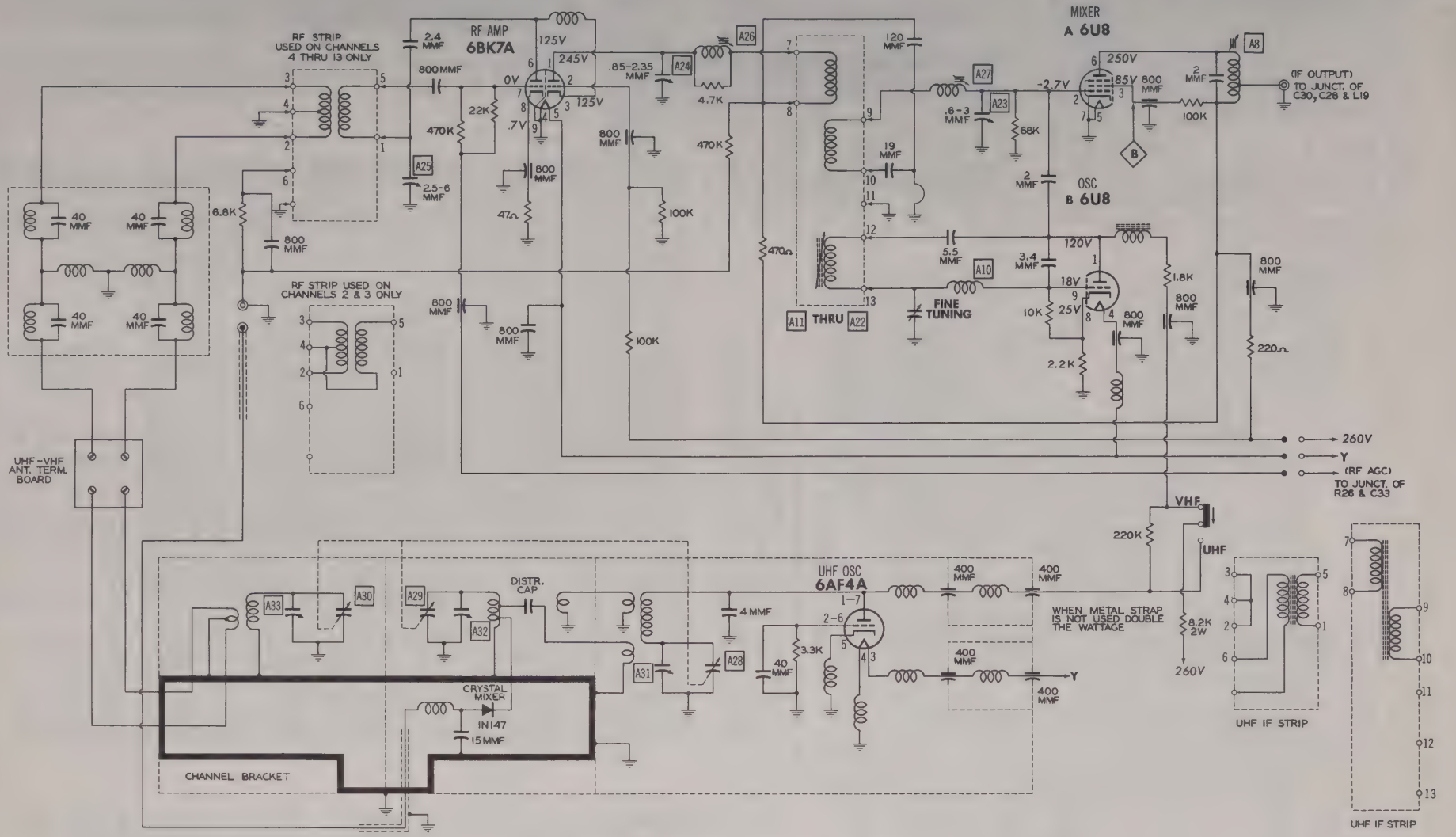
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BK7A	† 750Ω	50KΩ	INF	0Ω	.1Ω	INF	3Meg	47Ω	0Ω
V 2	6U8	† 10KΩ	68KΩ	† 100KΩ	.1Ω	0Ω	† 300Ω	0Ω	2.2KΩ	12KΩ
V 3	6CB6	1Meg	450Ω	.1Ω	0Ω	▲ 470Ω	▲ 470Ω	0Ω		
V 4	6CB6	60KΩ	▲ 15Ω	.1Ω	0Ω	† 550Ω	† 550Ω	70KΩ		
V 5	6CB6	220Ω	340Ω	.1Ω	0Ω	† 5.6KΩ	† 5.6KΩ	0Ω		
V 6	12BY7	15Ω	2.7KΩ	15Ω	0Ω	0Ω	.1Ω	† 5.5KΩ	† 20KΩ	15Ω
V 7	12AX7	700KΩ	3.3KΩ	7KΩ	.1Ω	.1Ω	◓ 4.5Meg	350KΩ	0Ω	0Ω
V 8	6AU6	100KΩ	0Ω	.1Ω	0Ω	† 32KΩ	† 32KΩ	0Ω		
V 9	6BN6	300Ω	.3Ω	.1Ω	0Ω	† 22KΩ	5Ω	◓ 1.2Meg		
V 10	6AQ5	350KΩ	680Ω	0Ω	.1Ω	† 1.3KΩ	† 550Ω	350KΩ		
V 11	6BE6	18KΩ	0Ω	.1Ω	0Ω	† 60KΩ	1.6KΩ	10Meg		
V 12	12B4A	1.6KΩ	2.2Meg	.1Ω	0Ω	0Ω	TP	2.2Meg	NC	† 450Ω
V 13	6CN7	0Ω	2Meg	1Meg	.1Ω	0Ω	560Ω	10Meg	† 47KΩ	.8Ω
V 14	6SN7GTB	47KΩ	◓ 230KΩ	0Ω	33KΩ	†66Ω	10KΩ	0Ω	.1Ω	
V 15	6BQ6GA	NC	.1Ω	TP	† 15KΩ	470KΩ	TP	0Ω	0Ω	TOP CAP ◓ 8Ω
V 16	6AX4GT	TP	NC	120KΩ	NC	† 75Ω	NC	.1Ω	0Ω	
V 17	1B3GT		PINS	1-8	HAVE	INF	RESISTANCE			TOP CAP ◓ 278Ω
V 18	5U4GA	NC	20KΩ	NC	18Ω	NC	16Ω	NC	20KΩ	
V 19	21ALP4A	0Ω	† 80KΩ	PIN 6 ◓ 47KΩ	PIN 10 ◓ 47KΩ	PIN 11 † 300KΩ	PIN 12 .1Ω			

† MEASURED FROM PIN 2 OF V18.
▲ MEASURED FROM PIN 7 OF V4.
◓ MEASURED FROM PIN 3 OF V16.
TP-TIE POINT.
NC-NO CONNECTION.



TUBE PLACEMENT CHART



UHF – VHF TUNER PART NO. S23117 USED WITH UHF MODELS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE VHF-UHF TUNER SCHEMATIC

ZENITH MODELS X2229R, RU, X2230E, EU, R, RU, X2254M, MU, X2256, EU, R, RU, X2257, E, EU, R, RU, U, X2258, E, EU, R, RU, U, X2264EG, EGU, RG, RGU, X2640E, EU, R, RU (Ch. 19X21, U, 19X22, G, U, 19X24, U)

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	NOTES
V1	RF Amplifier	6BK7A	6BK7A	
V2	Mixer-Oscillator	6U8	6U8	
V3	Int. Freq IF Amplifier	6CB6	6CB6	
V4	2nd. Video IF Amplifier	6CB6	6CB6	
V5	3rd. Video IF Amplifier	6CB6	6CB6	
V6	Video Output	12BY7	12BY7	
V7	AGC Keyer-Vert. Mult.	12AX7	12AX7	
V8	Sound IF Amplifier	6AU6	6AU6	
V9	Audio Detector	6BN6	6BN6	
V10	Audio Output	6AQ5	6AQ5	
V11	Sync Amplifier	6BR5	6BR5	
V12	Vert. Mult.-Vert. Output	12BM4	12BM4	12BM may be used as an alternate
V13	Horiz. AFC	6CN7	6CN7	
V14	Horiz. Osc.-Horiz. Discharger	6SN7GTB	6SN7GTB	
V15	Horiz. Output	6BQ6GA	6BQ6GT or 6CU6	6BQ6GT or 6CU6 may be used as an alternate
V16	Damper	6AX4GT	6AX4GT	
V17	HV Rectifier	1B3GT	1B3GT	
V18	LV Rectifier	5U4GA	5U4GA	5U4G may be used as an alternate

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: ZENITH PART No.	CBS PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V19	21ALP4A ①	21ALP4A ①	21ALP4A ①	21ALP4A ①	① Aluminized
		21ALP4B ①			② Silver screen "85"
			21ALP4A/B ①	21ALP4A/B ① ②	
		21ALP4	21ALP4	21ALP4	
	24DP4A ①	24DP4A ①	24DP4A ①	24DP4A ①	
				24DP4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	a40	400	33-3547		C037	FP365.5	TM-8040Z0-450	T-180	TVL-3722
B	a80	400			EH302	TC35	TM-8080Z0-450	MMT-0320	TVA-1205
C	a10	400							
D	30	25							
C2A	a4	350	33-3546				TM-3061	T-810	
B	100	50					TD-4-450	FM-4504	
C	a10	475							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	40		22-2511							
C4	40		22-2511							
C5	40		22-2511							
C6	40		22-2511							
C7	2.5-6		22-2231		539-6		532-10	CT552		
C8	3.4		22-2596			CU8SP15		PT4015	3TM-P15	
C9	900		22-2231	DD-9008	DD-901	G067	531-901	DC-102	5GA-T9	
C10	800		22-2577							
C11	800		22-2577							
C12	800		22-2577							
C13	900		22-2231	DD-9008	DD-801	G067	531-801	DC-102	5GA-T9	
C14	800		22-2577							
C15	.05-3		22-2453		539-3		535-5RT	CT565A	5TCC-T2	
C16	120		22-2591	NPO-DD120	TCZ-120	T2S5	NPO-253-121		5TCC-T12	
C17	18		22-2406	NPO-DD20	TCZ-20	T2S3	NPOK-200	ZT-542	5TCC-Q2	
C18	.8-3		22-2504		539-3		535-5RT	CT565A	5TCC-T2	
C19	3		22-2454	NPO-SZ2.5	TCZ-2R2	TZ05	NPOA-3R2		5TCC-V22	
C20	3.4		22-2592							
C21	5.8		22-2499							
C22	800		22-2577							
C23	800		22-2577							
C24	3		22-2565							
C25	800		22-2577							
C26	470		22-5	DD-90047	DD-471	KD60	531-471	UC-5347	5GA-T47	
C27	5.8		22-3643							Note 1
C28	30		22-2593	NPO-DD30	TCZ-30	Z025	NPOK-300	ZT-542	5TCC-Q3	Note 2
C29	34		22-2515	NPO-DD25	TCZ-25	Z025	NPOL-240	ZT-5425	5TCC-Q25	Note 3
C30	34		22-2515	NPO-DD25	TCZ-24	Z025	NPOL-240	ZT-5425	5TCC-Q25	
C31	45		22-2600			CU8SP15		PT4015	3TM-P15	
C32	.15	200	22-3547	P2S8N-15						
C33	10000		22-3	NPO-01	DD-103	K063	511-01	DC-511	5HK-S1	
C34	330		22-2309	E2330	DD-331	TP49	GP2K-331	UC-5333	5GA-T33	
C35A	1000		22-21	NPO-2X001	DD2-103	DK069	512-001	DCD-521	5HK-2D1	
B	1000									
C36	470		22-3302	S1470	DB-471	KD60	GP2K-471	UC-5347	5GA-T47	
C37	1000		22-17	NPO-001	DD-102	K069	501-001	DC-521	5HK-D1	
C38	470		22-3534	S1470	DB-471	KD60	531-471	UC-5347	5GA-T47	
C39	470		22-3217	S1470	DB-471	KD60	GP2K-471	UC-5347	5GA-T47	
C40	1000		22-3112	S11000	DB-102	TP52	GP2L-102	UC-531	5GA-D1	
C41	4.5		22-3522							
C42	7		22-3375			3014				
C43	.023	400	22-1761	NPO-S23	DD-233	CU5S232	517-03	PT4123	4TM-S22	
C44	47		22-3467							
C45	3.3		22-3343	NPO-S23.3	TCZ-3R3	TZ06	NPOA-3R3	ZT-5523	5TCC-V33	
C46	.1	300	22-1777	P2S8N-1	DD-104	CU5S21		PT4015	3TM-S1	
C47	.01	600	22-1848	BPD-01	DB-103	CU5AS81	GP3-333-103	PT411	4TM-S1	
C48	10000		22-3	BPD-01	DD-103	K063	511-01	DC-511	5HK-D1	
C48A	1000		22-21	NPO-2X001	DD2-103	DK069	512-001	DCD-521	5HK-2D1	
B	1000									
C50	90		22-3680	S150	DE-500	TP30	GP3K-500	UC-545	5GA-Q5	
C51A	1000		22-21	NPO-2X001	DD2-102	DK069	512-001	DC-521	5HK-2D1	
B	1000									
C52	10000		22-3	BPD-01	DD-103	K063	511-01	DC-511	5HK-S1	
C53	10		22-2378	BPD-00001	DE-100	TP09	531-100	UC-541	5GA-Q1	
C54	10000		22-3	BPD-01	DD-103	K063	511-01	DC-511	5HK-S1	
C55	470		22-5	S1470	DD-471	KD60	531-471	UC-5347	5GA-T47	Note 4
C56	39		22-3706	S139	DE-390	TP39	531-390	UC-5439	5GA-Q39	Note 4
C57	.0068	600	22-3495	BPD-0068	DE-682	CU5SD68	GP3-333-683		5TM-D68	Note 5
C58	3300		22-12	BPD-0033	DE-332	K077	511-0033	UC-5333	5HK-D33	
C59	27		22-3489		TCZ-27	Z027	NPOL-270			
C60	.033	400	22-1631							
C61	.1	400	22-3061	P4S8N-1	DF-104	CU5AP1		PT401	4TM-P1	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	RATING: VOLT.	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C62	.01	300	22-2566							
C63	.0047	600	22-1849		1464-0047		1RSD47	MC3665	MS-347	
C64	.047	200	22-1778		BPD-05	DF-503	CUS8347	PT4167	3TM-647	
C65	100		22-3		BPD-0001	DD-101	TP94	501-101	5GA-T1	
C66	150		22-1123		BPD-0015	DD-151	TP98	511-151	MC3256	5GA-T15
C67	.001	300	22-1839		BPD-001	DE-102	CUSM31	GP3L-103	PT521	4TM-D1
C68	4700		22-3624		1464-0047		1RSD47		MC3665	MS-347
C69	470		22-5		BPD-00047	DD-471	KO60	531-471	UC-5347	5GA-T47
C70	.047	600	22-1849		BPD-01	DE-503	CUS8381	GP3-333-103	PT411	4TM-S1
C71	.1	300	22-1777		P2S8N-1	DF-104	CUS8P1		PT401	3TM-P1
C72	680		22-1155		1464-00068	DE-681	1RS768	511-681		MS-568
C73	1000		22-13		BPD-0015	DD-152	507I	501-0015	DC-5315	5HK-D1
C74	1000		22-3163		1464-01		1RSD1	511-101	MC3255	MS-31
C75	1000		22-3598		BPD-001	DD-103	K069	501-001	DCD-5215	5HK-D1
C76A	1500		22-23		BPD-2X0015	DD2-152	DK071	512-0015		5HK-2D15
B	1500									
C77	.047	400	22-1775		BPD-05	DF-503	CUS8347		PT4167	4TM-S47
C78	.15	400	22-2351		P4S8N-15		CUS8P15		PT4015	4TM-P15
C79	130	4000	22-2697							
C80	.1	400	22-3061		P4S8N-1	DF-104	CUS4P1		PT401	4TM-P1
C81	75	3000	22-3638			DD30-750				
C82	82	2000				DD30-820				

Note 1. Chassis 19X22 and 19X24 use 9MMF in this application (part #22-3481).
Note 2. Chassis 19X22 and 19X24 use 17MMF in this application (part #22-3594).
Note 3. Chassis 19X22 and 19X24 use 30MMF in this application (part #22-2559).
Note 4. Used only in chassis 19X23 and 19X24.
Note 5. Chassis 19X22 and 19X24 use .0033MFD in this application (part #22-4).

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1Meg	½	63-3569	AB-897	A47-1Meg-S	QU-137	U-54	Volume-Note 1
B	Shaft		Not Req.	AK-15	FS-5	Not Req.	Not Req.	Attach to R1A.
C	Coupler		Not Req.	AK-16 *	Not Req.	C3 *	EC340 *	Attach to R1A.
D	Switch		Not Req.	SW-1	SWE-13	QU-1	U3-26	Attach to R1A.
R1A	1Meg	½	63-3257	AB-897	A47-1Meg-S	QU-137	U-53	Volume-Note 2
B	Shaft		Not Req.	AK-3	FS-3	Not Req.	Not Req.	Attach to R1A.
C	Switch		Not Req.	KB-1	SWE-12	76-1	U3-25	Attach to R1A.
D	Cover		Not Req.	KB-5				Attach to R1C.
R2A	7.5Meg	½	63-2919	AB-96	A47-7.5Meg-S	QU-143	U-52	Focus
B	Shaft		Not Req.	AK-1	FKS-1A	RQ	Not Req.	Attach to R2A.
R3A	8.5Meg	½	63-2946	AB-89 *	A47-7.5Meg-S	QU-143 *	U-52 *	Height-Stop at 7.5Meg
B	Shaft		Not Req.	AK-1	FKS-1A	RQ	Not Req.	Attach to R3A.
R4A	200KΩ	½	63-3573	AB-50	A47-200K-S	QU-129	U-43	Brightness
B	Shaft		Not Req.	AK-4	KS5-2	Not Req.	Not Req.	Attach to R4A.
R5A	1MΩ	½	63-3576	AB-30	A47-1M-S	QU-119	TA163L	AGC
B	Shaft		Not Req.	AK-1	FKS-1A	RQ	Not Req.	Attach to R5A.
R6A	750KΩ	½	63-3590	AB-98	A47-750K-S	QU-136	U-54	Vertical Hold
B	Shaft		Not Req.	AK-4	KS5-3	Not Req.	Not Req.	Attach to R6A.
R7A	3000Ω	½	63-3588	AB-42	A47-3000-S	QU-113	U-8	Vertical Linearity
B	Shaft		Not Req.	AK-1	FKS-1A	RQ	Not Req.	Attach to R7A.
R8A	5000Ω	4	63-3201	SVP-999	AU-5000		M5MFK	Contrast (Wire Wound)
B	Shaft		Not Req.	Not Req.	RS-3		Not Req.	Attach to R8A.
R9	800Ω	2	63-3384		39-800-50			Buzz (Wire Wound)
								Stop at 1000
R10A	4.5Meg	½	63-3308	AB-87	A47-5Meg-S	QU-141	TA56L	Fringe Lock
B	Shaft		Not Req.	AK-1	FKS-1A	Not Req.	Not Req.	Attach to R10A.

Note 1. Used in Chassis 19X21, 19X21U.
Note 2. Used in Chassis 19X23, 19X23U, 19X22Q, 19X22QU, 19X24, 19X24U.
* Saw off original control shaft and use with coupler to obtain original length shaft.
• Connect 1.5Meg resistor in series with the right hand terminal of the control, and the lead connecting to the same terminal of the original control (control viewed from shaft end, terminals down).

RESISTORS

ITEM No.	RATING	WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R11	470Ω	½	63-1855	BTS-47K	
R12	470KΩ	½	63-1897	BTS-470K	
R13	22KΩ	½	63-1841	BTS-22K	
R14	47Ω	½		BTS-47	
R15	100KΩ	½	63-1870	BTS-100K	
R16	100KΩ	½	63-1870	BTS-100K	
R17	4700Ω	½		BTS-4700	
R18	470Ω	½	63-1772	BTS-470	
R19	220Ω	½	63-1757	BTS-220	
R20	22KΩ	½	63-1841	BTS-22K	
R21	10KΩ	½	63-1827	BTS-10K	
R22	2200Ω	½		BTS-2200	
R23	10KΩ	2	63-1370	BTB-10K	
R24	100KΩ	½	63-1870	BTS-100K	
R25	68KΩ	½		BTS-68K	
R26	2.5Meg	½	63-1926	BTS-2.5Meg	
R27	220KΩ	½	63-1884	BTS-220K	
R28	220KΩ	½	63-1884	BTS-220K	
R29	82Ω	½	63-1737	BTS-82	
R30	470Ω	½	63-1772	BTS-470	
R31	56Ω	½	63-1733	BTS-56	
R32	27KΩ	½	63-1845		
R33	6800Ω	½	63-1851		
R34	18KΩ	½	63-1854		
R35	15Ω	½	63-1703	BTS-15	
R36	150Ω	½	63-1754	BTS-150	
R37	130K	½	63-1873	BTS-130K	
R38	130K	½	63-1873	BTS-130K	
R39	470Ω	½	63-1772	BTS-470	
R40	5900Ω	2	63-5233	BTH-5900	
R41	150Ω	½	63-1767	BTS-150	
R42	2.61Ω 5%	½	63-1956	BTS-2R610 5%	
R43	15KΩ	½	63-1894	BTS-15K	
R44	33KΩ	½	63-1846	BTS-33K	
R45	47KΩ	½	63-1855	BTS-47K	
R46	82KΩ	½	63-1885	BTS-82K	
R47	22KΩ	½	63-1906	BTS-22K	
R48	15Ω	½	63-1703	BTS-15	
R49	68Ω	½	63-1730	BTA-680	
R50	220KΩ	½	63-1884	BTS-220	
R51	100KΩ	½	63-1870	BTS-100K	
R52	470KΩ	½	63-1897	BTS-470K	
R53	33000Ω	½	63-1906	BTS-3300	
R54	680KΩ	½	63-1904	BTS-680K	

ITEM No.	RATING	WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	NOTES
R55	820Ω	½	63-1860	BTS-180K	
R56	100KΩ	½	63-1870	BTS-100K	
R57	10KΩ	½	63-1827	BTS-10K	
R58	1.2Meg	½		BTS-1.2Meg	
R59	680Ω	½	63-1779	BTS-680	
R60	22KΩ	½	63-1841	BTS-22K	
R61	470Ω	½	63-1772	BTS-470	
R62	680Ω	½	63-2390	BTA-680	
R63	10Meg	½	63-1953	BTS-10Meg	
R64	470KΩ	½	63-1897	BTS-470K	
R65	56KΩ	½	63-1858	BTS-56K	
R66	470KΩ	½	63-1897	BTS-470KΩ	
R67	82KΩ	½	63-1868	BTS-82K	
R68	22KΩ	½	63-1841	BTS-22K	
R69	230KΩ	½	63-1884	BTS-230K	
R70	100KΩ	½	63-1870	BTS-100K	
R71	47KΩ	½	63-1855	BTS-47K	
R72	320Ω	½	63-1758	BTS-320	
R73	2.5Meg	½	63-1926	BTS-2.5Meg	
R74	1200Ω	½	63-3590	BTA-1200	
R75	180KΩ	½	63-1877	BTS-180K	
R76	56Ω	½			
R77	56KΩ	½	63-1858		
R78	1Meg	½	63-1911		
R79	1Meg	½	63-1911		
R80	5.6Meg	½	63-1943		
R81	10Meg	½	63-1953		
R82	47KΩ	1	63-1154	BTA-47K	
R83	560Ω	½			
R84	10KΩ	2	63-3145	BTB-10K	
R85	22KΩ	½	63-1841		
R86	47KΩ	½	63-1855		
R87	180KΩ	1	63-2312	BTA-180K	
R88	18KΩ	½	63-1851		
R89	100Ω	½	63-1870		
R90	470KΩ	½	63-1897		
R91	100Ω	½	63-1744		
R92	15KΩ	2	63-942	BTB-15K	
R93	47KΩ	½	63-3282	BTS-47K	
R94	1000Ω	½	63-1786		
R95	3.3Ω	½	63-2709	BWH-3.3	
R96	100KΩ	½	63-1870	BTS-100K	
R97	1000Ω	½	63-1786	BTS-1000	Note 1
R98	10KΩ	½	63-1827	BTS-10K	Note 1

Note 1. Used in Chassis 19X22, 19X24.

TRANSFORMER (POWER)

ITEM No	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA: ZENITH PART No	Halldorson PART No	Merit PART No.	Stancor PART No	Thordarson PART No	Triad PART No
T1	117VAC	534VCT @ 1.5A	5V @ .270A	6.3V @ 3A	12.6VCT @ 4.4A	95-1375				26R33 ①

① Tape high HV winding tape 5V @ 3A winding, connect 5.3V windings in series and phase, ground center tap and use as original transformer.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: ZENITH PART No	Halldorson PART No	Merit PART No	RCA TYPE No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No
T2	Horiz. Output Trans.	S-22998 ⊥					A-8276		D-60 *
T3	Vert. Output Trans.	95-1464	21900 ③ ⑤	A-2823 ⑤		V307 ③	A-8448 ③	26872 ③	A-103X ② ⑤
		95-1441 ③	21900 ③	A-2823 ⑤		V307 ③	A-8448 ③	26872 ③	A-103X ⑥ ⑤
T4A	Yoke(90°) Horiz. (12MC	95-1443	DF508 ⑩ ⑫	MDF-91 ⑩ ⑫	237D1 ⑩ ⑫	T90F12A7 ⑩ ⑫	DY-13A ⑩ ⑫	Y-14 ⑩ ⑫	Y-40-1 ⑩ ⑫
B	Vert. (42MC	95-1465 ③ S-19899 ③ S-23237 ③							

① Complete assembly includes: winding and terminal assembly, Zenith Part No. S-23081 tertiary winding and terminal assembly, Zenith Part No. S-21264
② Alternate Zenith Part number.
③ Use 8 to 1 turns ratio.
④ Connect as auto transformer.
⑤ Drill new mounting hole(s).
⑥ Cut and tape green lead.
⑦ Includes capacitor C79, resistors R76, R77.
⑧ Yoke rear cover and centering device, part of 95-1443.
⑨ Yoke rear cover and centering device, part of 95-1465.
⑩ Use original horizontal yoke damping network, with capacitor across terminals #3 and #7.
⑪ Connect horizontal yoke terminal #3 to horizontal output transformer terminal #3; horizontal yoke terminals #2 and #7 to resistor R94; Horizontal yoke terminal #1 to capacitor C77.
⑫ Use original rear cover and centering device.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	RCA Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
5							6
4							5
3							4
2							N.C. See Note 13
1							3
Special Notes							⑬

⑬ To reduce yoke "ringing", connect resistor R94 in series with capacitor C79, across terminals #2 and #1 of horizontal yoke.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: ZENITH PART No.	Halldorson PART No.	Merit PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T5	10.5KΩ	3-4Ω	95-1379	Z1000	A2932	A3879	24S60	S-51X	

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: ZENITH PART No.	QUAM PART No.	RCA TYPE No	NOTES
SP1	5 1/4"	PM	3-4Ω	49-751 ①	52A1	217S1	① Used in Models X2329R, X2329RU, X2330R, R, U.
	7"	PM	3-4Ω	49-780 ②			② Used in Models X3256R, R, U.
	7"	PM	3-4Ω	49-783 ③			③ Used in Models X2340R & R.
	10"	PM	3-4Ω	49-752 ④	10A31	236S1	④ Used in Models X2354R, X2357R & R, X2358R & R, X2364RQ & EQ, X2640U & RU.

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	IF Trap	0Ω		20-506				
L2	IF Trap	0Ω		20-505				
L3	FM Trap	0Ω		20-490				
L4	IF Trap	0Ω		20-506				
L5	IF Trap	0Ω		20-505				
L6	FM Trap	0Ω		20-490				
L7	Ant. Coils	0ΩCT	0Ω					
L8	Fil. Choke	0Ω		20-391				
L9	Vert. Coil	0Ω		20-431				
L10	RF, Mixer Grid, Osc. Coil	0Ω		20-490				
L11	RF Coil	0Ω		20-537				
L12	Mixer Grid Coil	0Ω		20-538				
L13	Mixer Grid Coil	0Ω		126-764				
L14	Osc. Coil	0Ω		20-541				
L15	RF Coil	1.2Ω		S-18659				
L16	Conv. Plate	7Ω						
L17	47.25MC Trap	0Ω		S-21718			6238	Tapped @ 5.7Ω
L18	38.75MC Trap	0Ω		S-21719			6235	Core Part No. 149-145
L19	1st Video IF	.1Ω		S-21041				Core Part No. 149-144
								Includes 4L 25MC Trap-
L20	2nd Video IF	.1Ω	.1Ω	S-17907	17-5004 *	TV-125 *	6234 *	Core Part No. 149-160
L21	3rd Video IF	.1Ω	.1Ω	S-19952	17-5003 ■	TV-125 ■	6233 ■	Complete Assembly Part No. S-21686-C-Tuned Part No. 149-180
L22	4th Video IF	.3Ω	.3Ω	S-20823				
L23	Series Peaking Coil	5.5Ω		S-17913	19-3003	TV-121	6177	95 Microhenries
L24	Shunt Peaking Coil	5.5Ω		S-21565	19-3180 ▲	TV-154 ▲	4644 ▲	160 Microhenries, Wound in series on 2.7KΩ resistor

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (cont)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L25	Series Peaking Coil	.9Ω		S-21888	19-1004		4610	6.7 Microhenries
L26A B	4.5MC Trap 1st Sound IF	12.5Ω 1.3Ω		S-21492				Core Part No. 149-89 (2 used)
L27	Series Peaking Coil	5.3Ω		S-21563	19-3125 ♦		6153 ♦	136 Microhenries; Wound on 5.6KΩ resistor
L28	2nd Sound IF	.3Ω	.3Ω	S-20219	16-3445			
L29	Quadrature Coil	5Ω		S-19020			1480 †	Core Part No. 149-160
L30	Horiz. Osc.	150Ω		S-19743	19-1577		6324	Tapped ⓐ 65Ω

* Use adaptor plate.
■ Detune trap and use adaptor plate.
▲ Series with 2.7KΩ resistor.
♦ Parallel with 5.6KΩ resistor.
† Drill new mounting hole.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ZENITH PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	RCA TYPE No.	Ram PART No.	Thordarson PART No.	NOTES
L30	150Ω		S-19743	19-1577		6324				Tapped ⓐ 65Ω

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L31	.270A	66Ω	2.2HY	95-1376	C5037 ①	C2996 ①	C2326 ①	26C44	C-23X

① Drill one new mounting hole.

FUSES

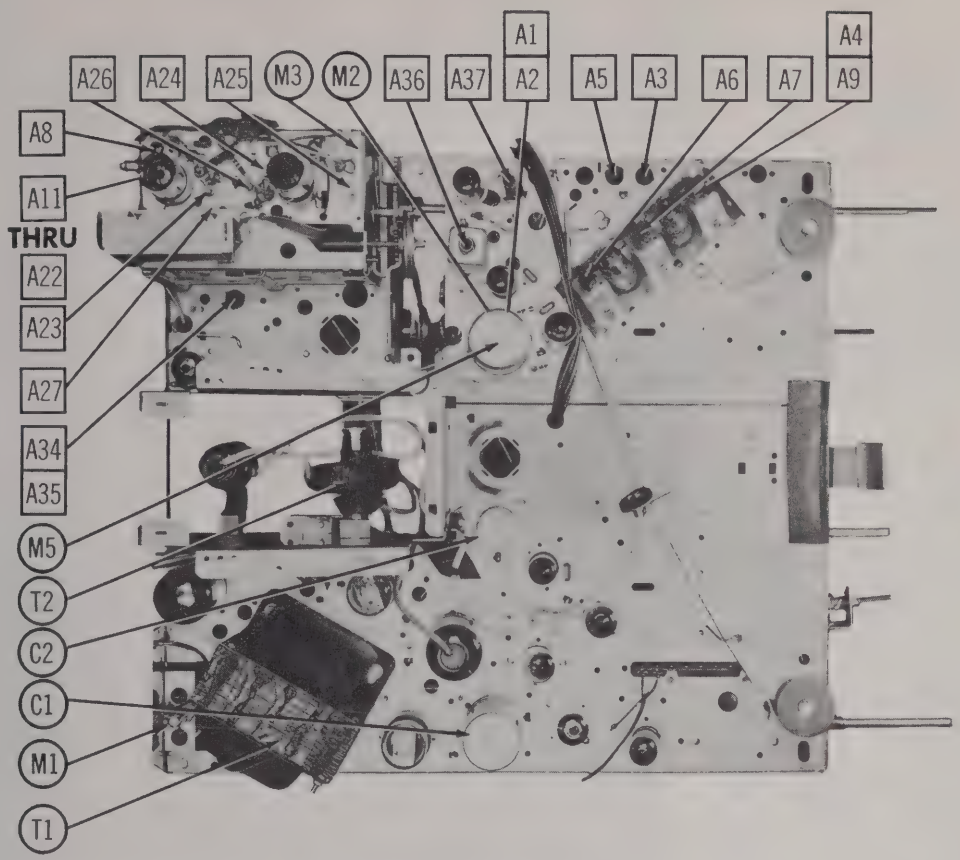
ITEM No.	TYPE	RATING	REPLACEMENT DATA ZENITH PART No. FUSE	ZENITH PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AG S/B	2/10A 125V	136-23		313.200 (3AG S/B 2/10A)	357001	MDL 2/10	4405

CRYSTAL DIODES

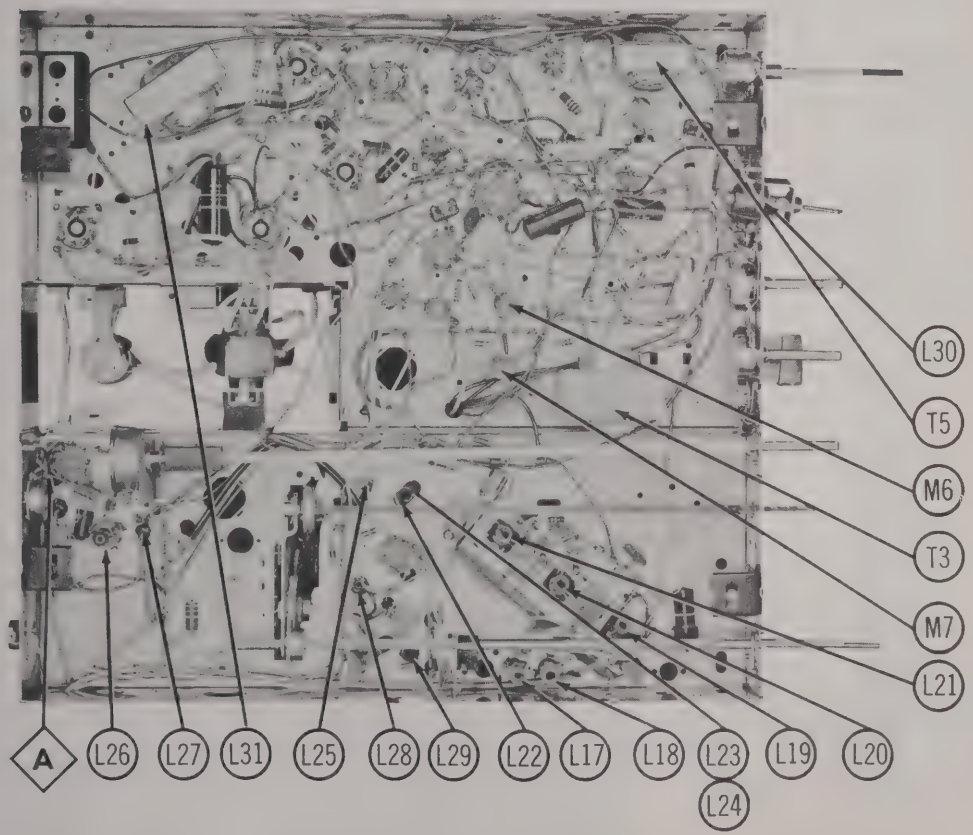
ITEM No.	ORIG. TYPE	REPLACEMENT DATA ZENITH PART No.	REPLACEMENT DATA SYLVANIA PART No.	NOTES
M2	1N64	103-1	1N60	Video Det. (Pigtail)

MISCELLANEOUS

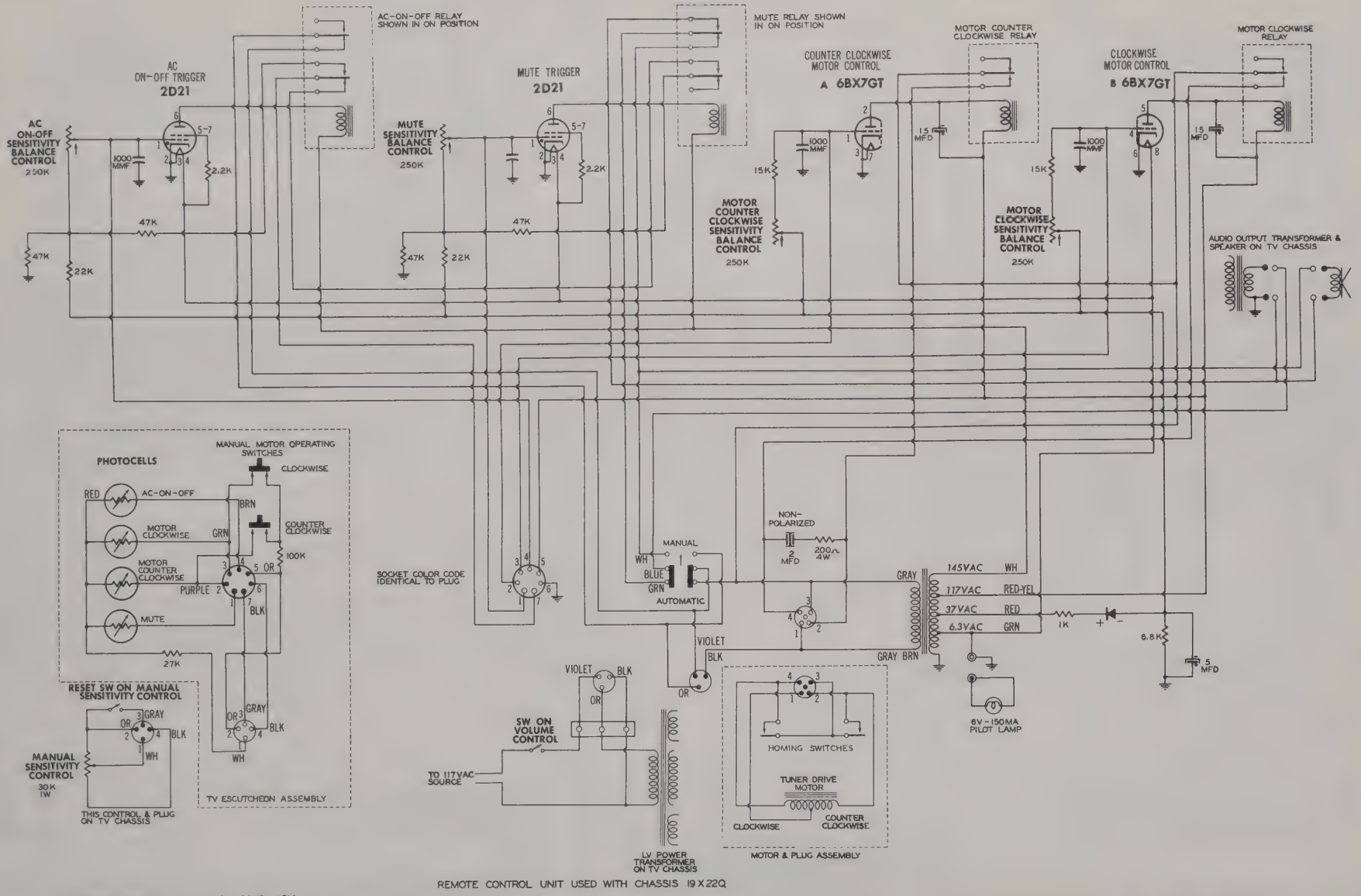
ITEM No.	PART NAME	ZENITH PART No.	NOTES
M3	Tuner	S21735	VHF (13 Position) - Chassis 19X21, 19X22, 19X22Q, 19X24
M4	Tuner	S23117	VHF-UHF Combination - Chassis 19X21U, 19X22U, 19X24U, consists of VHF tuner part #S-23113 & UHF tuner part #S-23115
M5	Video Det. Assy.	S-21686	Includes M2, L22, L23, L24, C41, C42
M6	Integrator	87-5	Vertical
M7	Integrator	87-4	Vertical
M8	Centering Device	S-19898	Part of deflection yoke (T4) rear cover, Chassis 19X21, U, 19X22, U, 19X22Q
	Centering Device	S-23237	Part of deflection yoke (T4) rear cover, Chassis 19X24, U
M9	Width Control	199-193	
M10	Ion Trap	S-22574	
M11	Correction Magnet	S-23241	Not used in some versions of Ch. 19X21, U, 19X22, U, 19X22Q
	Correction Magnet	S-18763	Chassis 19X24, U
M12	Correction Magnet	S-23241	Not used in some versions of Ch. 19X21, U, 19X22, U, 19X22Q
	Correction Magnet	S-18763	Chassis 19X24, U
	Cabinet	14-1803	Models X2229R, RU
	Cabinet	14-1801	Models X2230R. RU
	Cabinet	14-1802	Models X2230E. EU
	Cabinet	14-1876M	Models X2254M. MU
	Cabinet	14-1898E	Models X2256E. EU
	Cabinet	14-1898R	Models X2256R, RU
	Cabinet	14-1877	Models X2257, U, X2257E, EU
	Cabinet	14-1877R	Models X2257R, RU
	Cabinet	14-1887E	Models X2258E, EU
	Cabinet	14-1887R	Models X2258R, RU
	Cabinet	14-1886R	Model X2264RQ
	Cabinet	14-1886E	Model X2264EQ
	Cabinet	14-1896E	Models X2640E, EU
	Cabinet	14-1896R	Models X2640R, RU
	Safety Glass	192-200	Models X2229R, RU, X2230E, EU, R, RU
	Safety Glass	192-206	Models X2254M. MU, X2257, U, E, EU, R, RU, X2258E. EU. R. RU, X2264RQ. EQ
	Safety Glass	192-213	Models X2256E. EU, R, RU
	Safety Glass	192-207	Models X2640E, EU. R, RU
	Mask	196-263	Models X2256E, EU, R, RU



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENT.



REMOTE CONTROL UNIT USED WITH CHASSIS 19X22Q

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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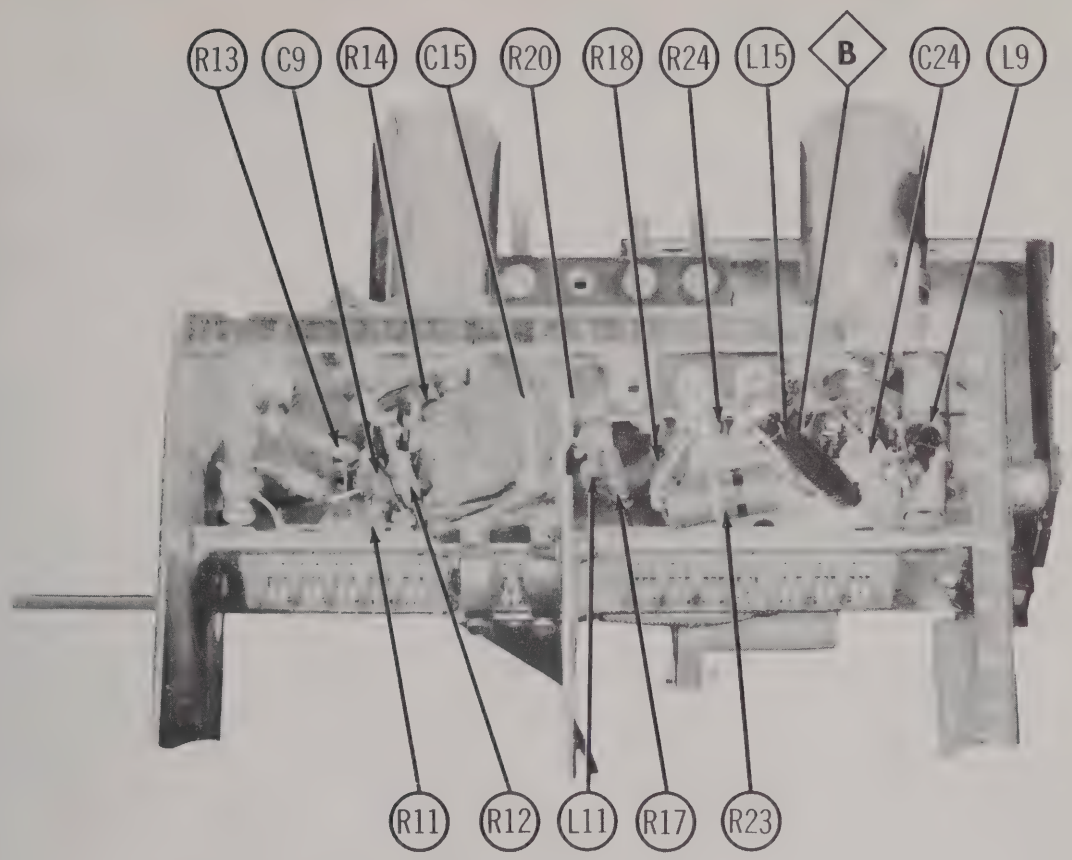
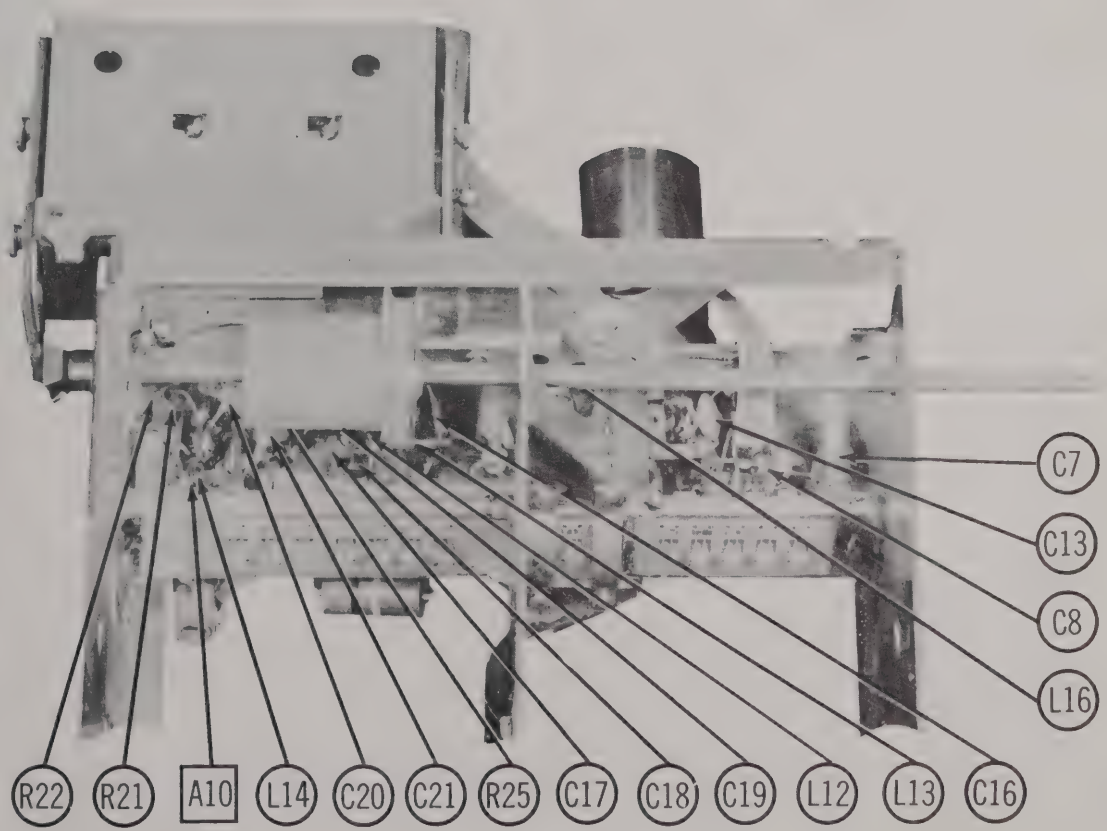
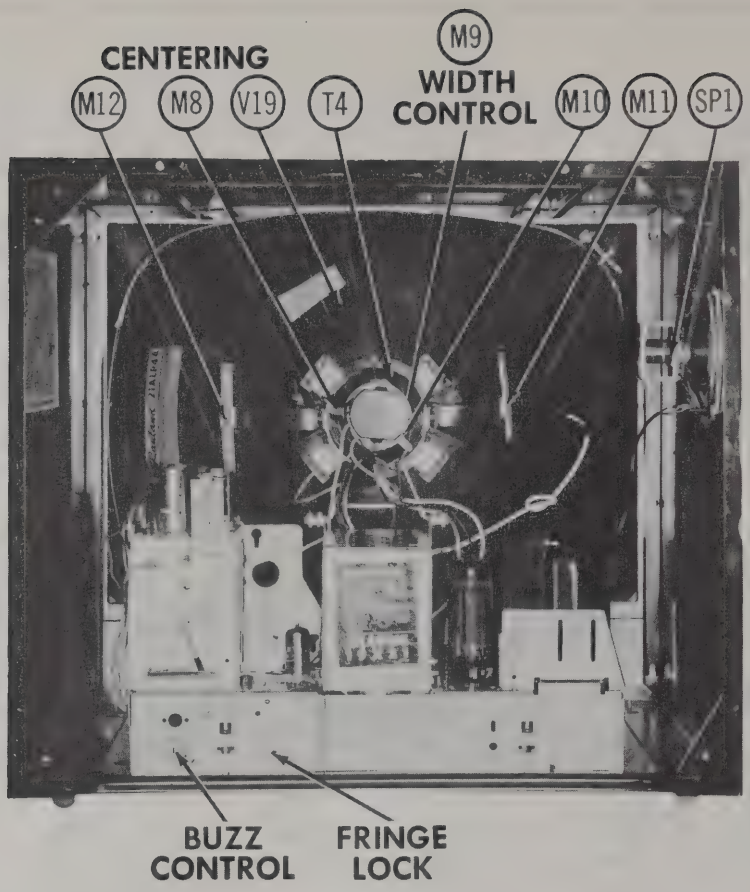
REMOTE CONTROL CIRCUIT SCHEMATIC



RF TUNER-RIGHT SIDE



RF TUNER-LEFT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Adjust the horizontal hold control until the picture synchronizes horizontally.

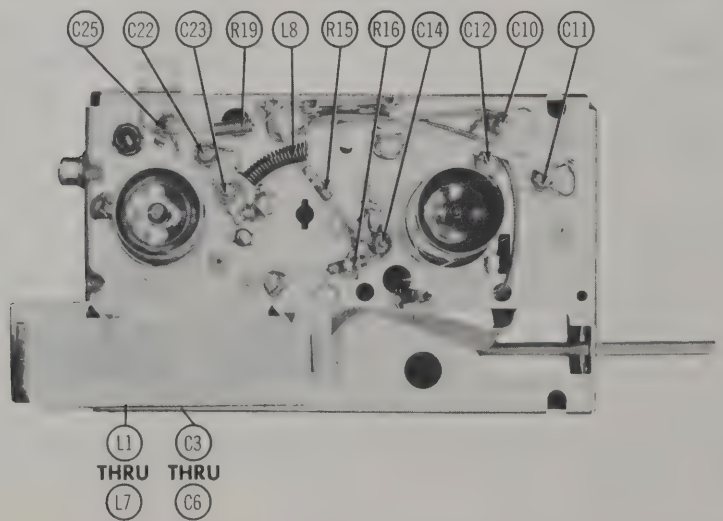
Adjust the brass width sleeve on neck of picture tube for a picture slightly wider than necessary to fill the picture mask horizontally.

AGC DELAY ADJUSTMENT

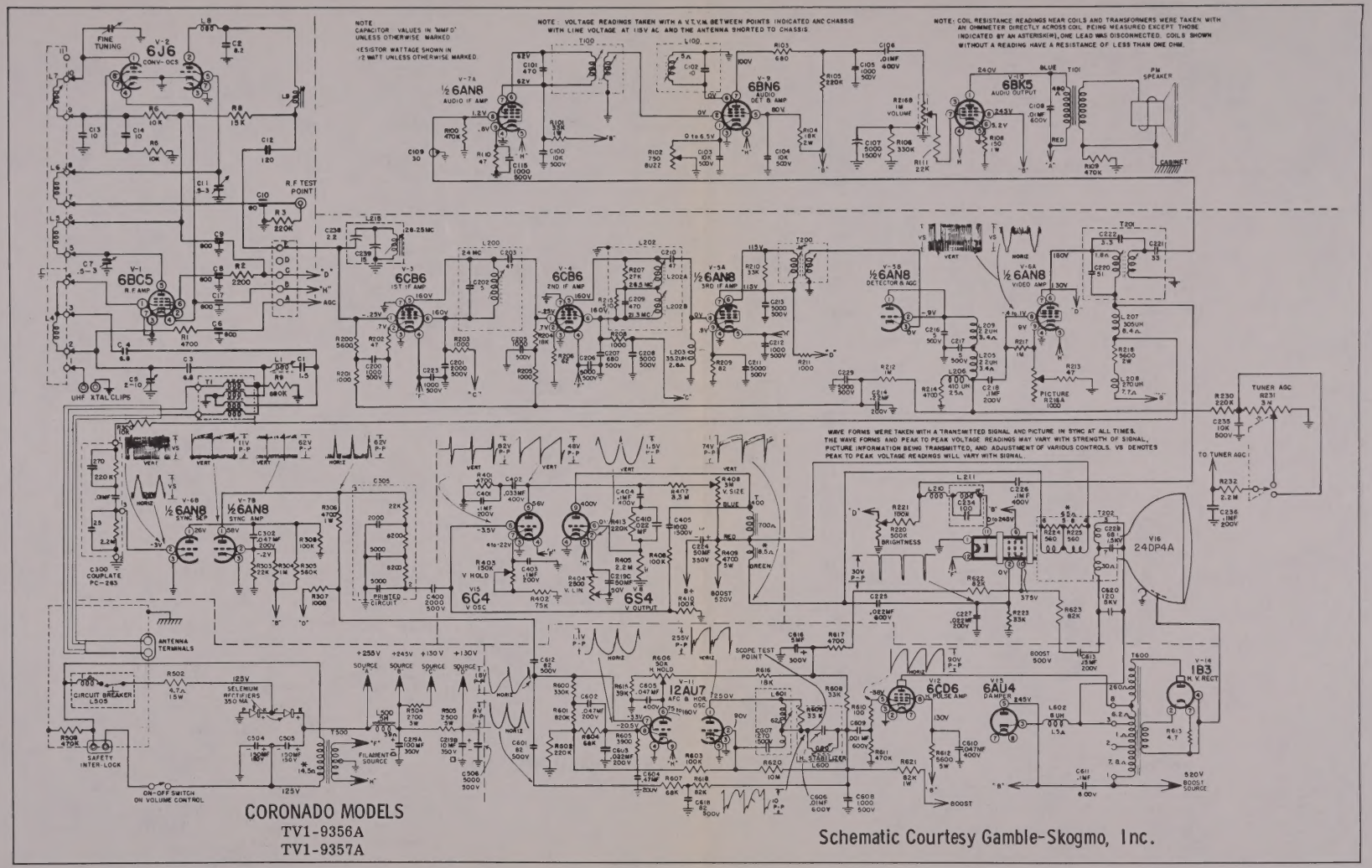
Connect the vertical input lead of an oscilloscope thru a 10KΩ resistor to point (A). Tune in the strongest available TV station and adjust the AGC control for a 2 volt peak to peak signal.

FRINGE LOCK ADJUSTMENT

Turn the fringe lock control 1/4 turn from fully clockwise. Adjust the vertical and horizontal hold controls for picture synchronization and check stability by switching off channel and back again. If necessary, retouch fringe lock adjustment for maximum stability while testing as above.

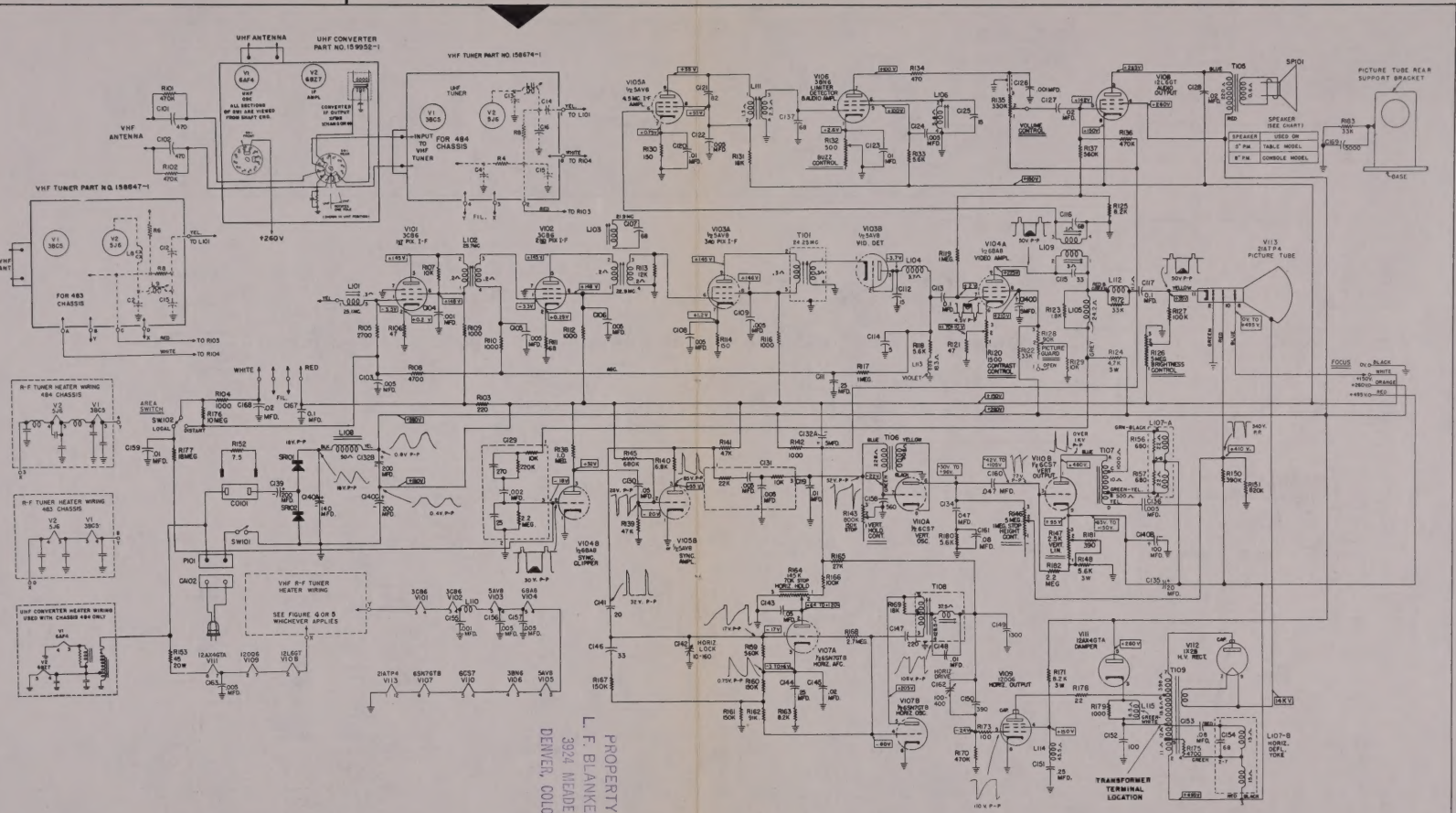


RF TUNER TOP VIEW


NOTE: CAPACITOR VALUES IN "MMFD" UNLESS OTHERWISE MARKED.
RESISTOR WATTAGE SHOWN IN 1/2 WATT UNLESS OTHERWISE MARKED.
NOTE: VOLTAGE READINGS TAKEN WITH A V.T.V.M. BETWEEN POINTS INDICATED AND CHASSIS WITH LINE VOLTAGE AT 115V AC AND THE ANTENNA SHORTED TO CHASSIS.
NOTE: COIL RESISTANCE READINGS NEAR COILS AND TRANSFORMERS WERE TAKEN WITH AN OHMMETER DIRECTLY ACROSS COIL BEING MEASURED EXCEPT THOSE INDICATED BY AN ASTERISK(*), ONE LEAD WAS DISCONNECTED. COILS SHOWN WITHOUT A READING HAVE A RESISTANCE OF LESS THAN ONE OHM.
WAVE FORMS WERE TAKEN WITH A TRANSMITTED SIGNAL AND PICTURE IN SYNC AT ALL TIMES. THE WAVE FORMS AND PEAK TO PEAK VOLTAGE READINGS MAY VARY WITH STRENGTH OF SIGNAL, PICTURE INFORMATION BEING TRANSMITTED, AND ADJUSTMENT OF VARIOUS CONTROLS. VS DENOTES PEAK TO PEAK VOLTAGE READINGS WILL VARY WITH SIGNAL.
FINE TUNING
V-2 6J6 CONV-OCS
V-1 6BC5 R F AMP
V-3 6CB6 1ST I F AMP
V-4 6CB6 2ND I F AMP
V-5A ½ 6AN8 3RD I F AMP
V-5B ½ 6AN8 DETECTOR & AGC
V-6A ½ 6AN8 VIDEO AMP
V-6B ½ 6AN8 SYNC SEP
V-7A ½ 6AN8 AUDIO I F AMP
V-7B ½ 6AN8 SYNC AMP
V-8 6BN6 AUDIO DET & AMP
V-10 6BK5 AUDIO OUTPUT
V-11 12AU7 AFC & HOR OSC
V12 6CD6 PULSE AMP
V13 6AU4 DAMPER
V14 1B3 H V RECT
V15 6C4 V OSC
V16 24DP4A
6S4 V OUTPUT
R F TEST POINT
PM SPEAKER
CABINET
TUNER AGC
TO TUNER AGC
UHF XTAL CLIPS
ANTENNA TERMINALS
CIRCUIT BREAKER L505
SELENIUM RECTIFIERS 350 MA
SAFETY INTER-LOCK
ON-OFF SWITCH ON VOLUME CONTROL
FILAMENT SOURCE
SCOPE TEST POINT
H. STABILIZER
PRINTED CIRCUIT
COUPLATE PC-283
+255V SOURCE
+245V SOURCE
+130V SOURCE
+130V SOURCE
125V
BOOST 520V
BOOST SOURCE
V HOLD
V LIN
H HOLD
V SIZE
BRIGHTNESS
PICTURE

CORONADO MODELS
TV1-9356A
TV1-9357A

Schematic Courtesy Gamble-Skogmo, Inc.



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DENVER, COLORADO

Schematic Courtesy Crosley - Division AVCO Mfg. Corp.

CROSLEY MODELS

J-21CABH	(Ch. 483)	J-21TABH	(Ch. 483)
J-21CAMH	(Ch. 483)	J-21TAMH	(Ch. 483)
J-21RABH	(Ch. 483)	J-21TAWH	(Ch. 483)
J-21RAMH	(Ch. 483)		

CROSLEY MODELS

J-21CABU	(Ch. 484)	J-21TABU	(Ch. 484)
J-21CAMU	(Ch. 484)	J-21TAMU	(Ch. 484)
J-21RABU	(Ch. 484)	J-21TAWU	(Ch. 484)
J-21RAMU	(Ch. 484)		

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